

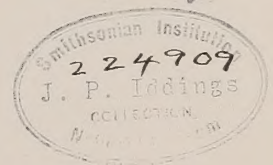
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AGAVE IN THE WEST INDIES

BY

WILLIAM TRELEASE

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AGAVE IN THE WEST INDIES.

By WILLIAM TRELEASE.

ANALYSIS.

Conspicuous and strikingly dissimilar to anything then known in Europe, the American aloes, as they have come to be called, must have attracted the attention of Columbus and his companions, when, in the Bahamas and Antilles, they discovered the New World in the autumn of 1492. It appears to have been use rather than form, however, which first excited comment, and the earliest written mention of them is found in Chanca's account ² of the aloes of Haiti (1493) and Oviedo's (1535)³ commentary on the maguei of Haiti and the Arayan mainland.

As plants, the West Indian agaves were first described and pictured in Munting's *Aloe americana minor* (1680) (pl. A) ascribed by Boerhaave to Curaçao, Hermann's *Aloe americana sobolifera* (1687) (pl. 44) from Jamaica, and Dillenius's *Aloe barbadensis*, etc. (1732) (pl. 34) from Barbados. Their nomenclature under *Agave*, apart from deviations in spelling, comprises *A. vivipara* (1753), *A. karatto* (1768), *A. americana* (1774), *A. spicata* (1802), *A. antillarum* (1827), *A. sobolifera* (1834), *A. offoyana* (1864), *A. legrelliana* (1866), *A. coccinea* (1876), *A. caribaea* (1877), *A. morrisii* (1887), *A. polyacantha* (1888), *A. mexicana* (1889), *A. rigida* (1890), *A. willdingii* (1891), *A. dominicensis* (1893), and *A. wightii* (1907), the date in each case marking the first connection of the name with an Antillean plant. The five names in italics properly belong to continental species that do not enter into the West Indian flora; those in lower case Roman type are synonyms of two of the remaining 10 species which, under these or different names, belong to that flora. *A. spicata*, described at Madrid from a plant supposedly native at Havana, is now regarded as of continental origin and has no close allies in the West Indies.

Until within recent years herbarium material of *Agave*, and especially of its West Indian representatives, has been both scanty and questionable. My attention was diverted from a general study of the genus in 1905 by the receipt of specimens of a strikingly xerophytic new form (pls. 101-103) collected on Inagua by Mr. George V. Nash of the New York Botanical Garden, and no small part of the time that could be given to the genus for the past five years has gone to an examination of its West Indian representatives, of which extensive collections brought together by the several energetic collectors of the New York Botanical Garden have been supplemented by specimens contributed by correspondents resident or traveling in the archipelago and by my own gleanings during one field trip on which nine of the islands were visited. To the collectors who are mentioned in connection with the specimens cited, and especially to Professor N. L. Britton and his associates, is due the possibility of bringing together the following synopsis of species. In this, gaps still remain to be filled and errors of judgment doubtless occur, but otherwise it is believed to contain a fairly complete presentation of the West Indian agaves, except that the large and little-explored islands of Cuba and especially Haiti may be expected to yield additional species of their characteristic groups, and collections are still to be seen from several minor islands.

The plants occur more or less locally on the several islands and usually affect rocky places or arid exposures (pls. 4, 9, 84, 95, 101), sometimes in association with cacti (pl. 74). Appar-

¹ Presented in abstract before the National Academy of Sciences, Nov. 8, 1910; analysis of geographical distribution and probable mode of introduction previously communicated to the National Academy of Sciences, Apr. 19, 1910, and to the Academy of Sciences of St. Louis, May 16, 1910.

² See Smithsonian Misc. Coll., vol. 48, 1907, p. 455.

³ See Rept. Missouri Bot. Gard., vol. 18, 1907, p. 32.

ently they are to be sought with confidence on the few islands of any size for which none are yet known. As a rule, except for the larger islands and the Leeward group of the continental shelf, only one form is found on an island, and each is confined to a single island or to islands rising from a common bank. The impression produced is that each main division of the archipelago possesses a distinctive species of large-flowered *Agave* differentiated into minor forms on its several islands. The coordination of these forms, however, reveals such manifold agreements and differences in characters as to result in the conviction that they themselves constitute species, in a conservative sense, and that the more comprehensive and widely distributed types are really groups of species rather even than superspecies; and they are so treated here.

Of the 50 species here recognized for the West Indian flora, 3 (pls. 106-115)—*Agave angustifolia*, *A. fourcroydes*, and *A. sisalana*—are clearly introductions, and represent a group of the Yucatan region. The other species are all endemic. Five of them are confined to islands on the continental shelf adjacent to the Venezuelan coast, where a closely allied species occurs on the mainland; and, though the affinity is not very close, these appear to be related in a manner to the as yet uncharacterized Costa Rican *Agave Wercklei*. None of the others shows close relationship with any form of the North American table-land, on which, especially in Mexico, the genus centers.

Even on superficial examination, the indigenous species fall into three groups: A small-flowered rigid-leaved very xerophytic type (pls. 101-105), confined to the Inaguas; a small-flowered fleshy-leaved type (pls. 93-100), of Cuba and its islets; and a medium or large-flowered fleshy-leaved type (pls. 1-92), ranging through the entire chain of islands and reaching the Venezuelan coast. Closer acquaintance with it shows that this third type—the representatives of which are mostly stately plants, rivaling in size the well-known century plant (*A. americana*) with which they have often been confounded—really consists of four separable groups: (a) An ample-panicked capsule-bearing type with usually green leaves ending in a long grooved spine and often repand and bordered with rather large prickles (pls. B and 41-82), of the Greater Antilles; (b) a similar but rather smaller-panicked type with mostly gray leaves ending in a long flat or grooved spine and bordered with moderate prickles (pls. B and 83-92) of the Bahamas; (c) a rather narrow-panicked sometimes exclusively bulbiferous type with usually green, straight and rosy edged leaves ending in a little-grooved short spine or mucro, below which, however, the leaf tip hardens into a heavy involute base, and bordered with minute or close-set prickles (pls. B and 14-40), of the Caribbees and Leeward Islands; and (d) a smaller if anything more succulent type with green or glaucous rather repand leaves ending in a long and usually slender grooved or involute spine and bordered with rather slender prickles (pls. B and 1-13), which is peculiar to the Leeward Islands and the adjacent Venezuelan mainland.

The small-flowered forms comprise two not intimately if at all allied groups: (a) Inaguenses (2 species), limited to the Inagua and Caicos islands; and (b) Antillares (5 species and one minor form), of the Cuban region. The large-flowered forms, on the other hand, to which the Antillares appear to be allied, include four related much differentiated groups: (a) Antillanae (14 species and three minor forms) of the Greater Antilles, (b) Bahamanae (6 species) of the Bahamas, (c) Caribbaeae (15 species), of the Caribbees, and (d) Viviparae of the Leeward Islands (5 species) and of northern Venezuela (1 species). None of the species into which these groups are divisible, so far as now known crosses a 100-fathom barrier, however narrow, except as they might be understood to do so when heading the labyrinthine channels of the Bahamian banks.

The characters and affinities of the groups are shown more clearly in a contrast of the species taken as typical of each than in any other form of analysis, as follows:

Leaves broad or curved, fleshy. (Native.)

Plants moderately large, suckering, bulbiferous. Leaves green, transiently glaucous; spine acicular, involutely grooved; prickles rather close together. Flowers and seeds medium-sized. (VIVIPARAE).....*Agave vivipara*.

Plants large, not suckering, bulbiferous. Flowers and seeds rather large.

Spine obliquely mucronate from an involutely slit tumid base; prickles rather close together. Leaves green. (CARIBAEAE).....*A. Karatto*.

Spine conical; prickles rather distant.

Leaves green. (ANTILLANAE).....*A. antillarum*.

Leaves gray. (BAHAMANAE).....*A. bahamana*.

Plants moderately large, not suckering or bulbiferous. Leaves green or slightly glaucous; spine conical, narrowly grooved; prickles rather distant; flowers and seeds small. (ANTILLARES).....*A. Willdingii*.

Leaves narrow, erect, firm. (Native.)

Plants small, suckering, not bulbiferous. Leaves few, gray; spine conical; prickles rather close together. Flowers and seeds small. (INAGUENSES).....*A. Nashii*.

Leaves narrow, spreading, firm. (Introduced.)

Plants moderately large, suckering, bulbiferous. Leaves numerous, grayish; spine conical; prickles rather distant. Flowers and seeds large. (SISALANAE).....*A. angustifolia*.

Inferences from examination of the plants and from analysis of their geographic distribution are: (a) That even narrow sea channels here constitute all but insuperable natural barriers to their dissemination, notwithstanding that the century plant is known to be cast up occasionally along the Mediterranean in viable condition; (b) that the significance of a channel barrier lies rather in depth of submergence, corresponding to lapse of time, than in width; (c) that the narrow but very deep channel separating the Greater Antilles from the Caribbean chain has afforded a longer isolation than the chasm between Jamaica and Haiti or the channels that part the Caribbees; and (d) that the Bahamas have had more recent interchange with the Greater Antilles than has existed between these and the Caribbees, though less recent than that between adjacent islands of each group.

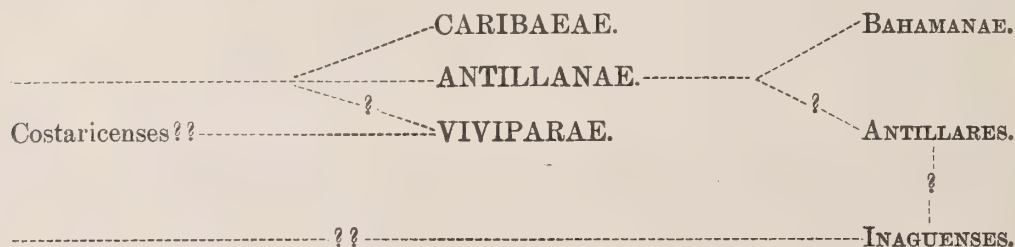
The closer relationship between the large-flowered insular groups of species than with any focal group of the mainland suggests that they have been derived through one rather than more than one continental immigration, and that they have been isolated from the ancestral source for a period longer than that of their separation from one another. The small-flowered Antillares may have originated locally in the mountains of Cuba from the large-flowered Antillanae; whether they furnished the parent stock of the Inaguenses, modified under unusually arid conditions, is a matter for less founded conjecture; but this latter group can hardly be accounted for otherwise, except by the assumption of an additional immigration from the mainland of an ancestral form which left no recognizable traces in the islands over which it must have passed.

There can scarcely be a doubt that the parent stock of the West Indian agaves, which are all paniculate, was derived from North America rather than from South America. Apart from the Viviparae common to the Leeward Islands and the coast region of Venezuela, the genus is not known as native to the southern continent except for one minute form (*Agave pumila*) reputed to occur in the Andes of Colombia, belonging to the spicate subgenus *Littaea*, and four as yet unnamed very glaucous small-prickled forms noted by Werckle¹ as occurring toward the headwaters of the Magdalena River of Colombia, which may be allied to *A. Wercklei*. North of the Isthmus, *Agave* is represented by many greatly diversified species of both *Littaea* and the paniculate subgenus *Euagave*.

It is hard to resist a belief (a) that perhaps, though not probably, with exception of the Viviparae, the genus penetrated from Yucatan to and through what are now the West Indies at a time when they formed a continuation of the Central American mainland; (b) that the Bahamian group derived its stock through later and transient union with the Greater Antilles; (c) that the Caribbean volcanic peaks were united by land at one time during the insular history of the genus, though they are now divided by deep-sea channels; and (d) that the peculiar species

¹ Monatsschr. f. Kakteenkunde, vol. 17, 1907, p. 122.

of Inagua entered by way of the Greater Antilles and not through the northern Bahamas (pl. E). The following diagram expresses these conclusions graphically:



Even between islands rising from a common bank covered by water of considerable depth, the local forms of *Agave* have undergone differentiation for the most part; but the small extent of differentiation between these forms, or even between the groups of species characteristic of the larger island groups, points to rather slow plasticity in the genus during the time which must have elapsed since their isolation (pls. D and E)—probably at an early period in modern geological time. The scant occurrence of *Agave* in South America may also indicate that this period antedates its passage of the Isthmus and supports the conclusion that the Antillanae rather than the Viviparae stand nearest to the parent stock.

This analysis does not require a discussion of the union and disruption of the continent before Tertiary time, or perhaps even during any part of that period. It is significant that *Agave* is so slightly represented in South America when compared with such Tertiary genera as *Fagus*. Geologists and physiographers, though they differ in willingness to admit elevations and depressions corresponding to the deepest present channels, find reason for believing in unions and disruptions of some sort; and a Pacific faunal element, found in the Gulf and Caribbean deposits, shows that the waters from the west must have entered when these were laid down. The West Indian agaves do not controvert Spencer's conclusion¹ that the deep channels separating these islands are to be interpreted as erosion canyons formed above the level of the sea in a land elevated after the Matanzas limestones and the Lafayette loams had been silted into still earlier canyon deeps at the end of the Tertiary period.

The mental image that may be formed of the Caribbean region in early Quaternary time is that of a rather low tableland stretching from what is now Yucatan and Central America to South America; bordered by a volcanic range the peaks of which now project some thousands of feet above the water, though the present difference of level between their summits and the intervening deeps may perhaps be due to crumpling as well as general elevation and attendant erosion; and including extensive lagoons corresponding to the present Caribbean deeps, with the Gulf of Mexico to the north constituting a great dead sea. Its climate, as Spencer surmises, may have been comparable with that of the Mexican plateau to-day, with torrential rainfall on its limiting mountains. No sounding data, as they are now obtainable, may be depended on to outline this connection of the continents, because elevations and subsidences can hardly be assumed to have been uniform throughout, but a restoration of the contours now marking 1,200 or 1,500 fathoms of depth gives an approximate suggestion of the extent of the land at this time (pl. D).

Onto this Pleistocene plateau, already sinking and soon cut off from Yucatan by the opening of a connection between the Gulf and the Caribbean Sea (pl. E), may be pictured the dry-shod passage of the primal form from which are descended the dominant and characteristic fleshy-leaved agaves of the West Indies, if not also of another form from which the now unique and localized xerophytic Inaguan group has sprung. These forms, making their way to the east and south around the widening seas and heading the fiords into which the settling canyons were passing, were undifferentiated, apart from local variation, until the filling by the sea of what is now the Anegada channel divided them into stocks from which have been derived the Antillanae and subsequently the Antillares to the north and the Caribaeae and probably

¹ Bull. Geol. Soc. America, vol. 6, 1895, p. 128, etc.

the Viviparae to the south. To the newer Bahamian table a transient connection with the Cuban land mass seems to have given the parent form of the group of species peculiar to the islands into which this intricately canyoned plateau has now settled. The segregation of the Viviparae from the dominant Caribbean form appears to have been effected early under continental influences, if they be not of Central American origin; that of the Antillares from the dominant Antillean form may be ascribed to the diversified physiography and attendant climatic differences of the great island, Cuba.

Successive disruption of each of the principal land masses, as subsidence continued (pls. D and E), has clearly afforded progressive isolation, with opportunity for local evolution, until each natural division of the archipelago now possesses its exclusive fleshy-leaved type, with subtypes on the great islands and next the South American continent; and each island or group of islands on a common bank possesses its distinctive species or group of species in which foliage, flowers, and fruit show diverse and intricate combinations of the group characters. The genus, therefore, here epitomizes unusually well the facts of insular evolution, a process which is fairly capable of division into three periods represented by: (1) The major groups, (2) such minor groups as extend through islands on a common bank, like the chain from Anguilla to Dominica, and (3) the species of which these groups consist to-day (see the table facing p. 1). Their source is so unquestionably North American and their limitation by water barriers is so marked as to leave little room for doubt as to the former existence of the much disputed Antillean union between the continents, whether or not in the exact form here outlined.¹

SPECIFIC CHARACTERS.

Because so commonly described from garden specimens, frequently young, the species of *Agave* that are currently listed are often hard to recognize in nature and it is very important to understand those differences which may be called characteristic. The constancy of agreements and differences is so marked in such well-known and commonly grown species as *A. americana*, *A. picta*, *A. Victoriae Reginae*, *A. filifera*, *A. fourcroydes*, etc., as to warrant confidence in the general stability of species on the one hand, while on the other the changes that plants undergo from youth to age and the differences that appear between seedlings of a common parentage as well as between plants ascribed to a single species indicate the necessity of caution in either stating or accepting characters as of absolute value, and suggest mutational plasticity.

TRUNK.²

In general, the trunk or caudex possesses little taxonomic significance in *Agave*, for, though many species are conveniently spoken of as acaulescent, the leaf bases as a rule cover a trunk which, denuded, is seen to be of measurable length. Such differences as the so-called acaulescent and subacaulescent species show (cf. *A. vivipara*, pl. 1, and *A. evadens*, pl. 9) are chiefly due to the number and relative thickness of the leaves and the degree of their persistence until the maturity of the plant. Marked exceptions only are of appreciable diagnostic value; such, for example, as those offered by *A. fourcroydes* (pl. 110), *A. attenuata*, and especially the truly arborescent *A. Karwinskii*,³ which have a distinct and much elongated trunk finally denuded or covered with dried leaves below.

¹ Apart from the many analyses of the boreal and austral elements in the general flora and fauna of the West Indies, reference may be made here to the newly published Phytogeographic Survey of North America by Harshberger (Engler and Drude, *Vegetation der Erde*, vol. 13, 1879), with its bibliography, as containing important data on this subject. The marked division in the flora corresponding to the Anegada Passage is noted by Eggers in his account of the Flora of St. Croix and the Virgin Islands (Bull. U. S. Nat. Mus., No. 13, 1879, pp. 13-16, etc.), and Hitchcock (Rept. Missouri Bot. Gard., vol. 4, 1893, p. 158, etc.) devotes several pages to figures that are very suggestive. The closer biological connection of Jamaica with Haiti than with Cuba is indicated by Barbour (Bull. Mus. Comp. Zool., vol. 52, 1910, p. 277), and a parallel to the entrance of *Agave* from Yucatan into Cuba rather than from Central America into Jamaica is indicated on a map illustrating the migrations of South American fresh-water fishes which accompanies Eigenmann's Catalogue of the Fresh-water Fishes of Tropical and South-Temperate America (Scott, Rept. Princeton Univ. Exped. to Patagonia, vol. 3, 1910).

² Engelmann, Trans. Acad. Sci. St. Louis, vol. 3, 1875, p. 293; Bot. Works, 1887, p. 301.

³ Rept. Missouri Bot. Gard., vol. 18, 1907, pl. 30.

LEAVES.¹

Among the leaves of such well-known cultivated species as have been named, ratio between length and breadth, basal and apical narrowing, concavity, stiffness, and direction of growth are fairly constant. In other species there may be great differences (compare plates 36, 37, and 107—*Agave barbadensis*, plates 45 and 46—*A. sobolifera*, plates 67 and 68—*A. Underwoodii*, and the plants contrasted on plates 76 and 79—*A. portoricensis*), though reason has scarcely been found for seeing more than individual or racial differences in either case. In these respects, too, hopeless contradictions and confusions were exhibited in the foliage of very young plants of the Bahamian species when their study was first taken up, and it may be that within this group apparently characteristic differences in the width of mature leaves, as shown by material now accessible, will prove inconstant. Within limits, smoothness or roughness of the leaf surface, as well as its coloration and the presence or absence of glaucousness, are indicative characters; but though some well-known species are persistently smooth, and others as persistently granulated, there are others in which a characteristic slight roughening varies into either extreme.

Very significant and constant, in the cultivated species referred to, are the characters presented by the apical spine (pl. B) and the sinuation and marginal arming of the leaves. In these features, indeed, seems to lie great, if not the greatest, stability in the leaf characters of the genus. Here, too, however, there are differences which must be understood and taken into consideration, for in repandness the leaf margins of spontaneous plants are found to differ to a very considerable extent, and the size and the form of basal widening of the prickles vary according to the amount of marginal tissue that has sclerified in their development. Contrasts of this sort are afforded by *Agave vivipara* and *A. petiolata* (pls. 2 and 8), different individuals of *A. sobolifera*, or the prickles of a single leaf of *A. Boldinghiana* (pl. 12) or of *A. Legrelliana* (pl. 59), etc.

The terminal spines of a species often show differences in stoutness which correspond with variations in the general form of the leaf tip; and the partial or complete evolution of the spine, sometimes depending on the chance of environment, may lead to marked differences in its structure and appearance. In this respect the groups of *Agave* sometimes differ greatly. It is in those forms with a determinate or clearly limited spine that this becomes most characteristic, for a definite part of the leaf tip is here devoted to spine formation, and its cells become hardened and colored early. Among native West Indian species indeterminate spines are the rule. In cultivation, species with an indeterminate spine often fail to develop more than a very short apical point of hard tissue, and *A. sobolifera* is often little pungent in gardens, while its wild representatives possess a strong though variable spine. No really sharp line may be drawn, however, between determinate and indeterminate spines, and in the species producing the latter a time usually comes, if they are well developed, when continued intrusion into the fleshy leaf tissue ceases, and the lower part, already dried, becomes nearly or quite as hard and deep in color as the apical part, or as an entire determinate spine.

The often very characteristic ventral grooving of the spine is greatly dependent on the chances attending the development of an indeterminate spine, for while a prompt basal hardening insures its perfection, the failure of such a hardening often results in its being pinched into a V-like form, a frequent occurrence in the most typical Antillanae and Bahamanae, though sometimes without uniformity of result. It is because of indeterminate development that the spines of the Caribaeae become so greatly and unequally thickened at the base; and the marked contrasts between slit-grooved and open-grooved spines in some forms of *A. Underwoodii* (pls. 69 and 70) and *A. portoricensis* (pls. 78 and 80) are apparently to be explained in no other way.

In addition to variations in the straightness of the leaf margin between the prickles, in its repandness, or in its abruptly hummocky appearance when such species as *Agave Karatto* (pl. 14) and *A. Harrisii* (pl. 50) or *A. Legrelliana* (pl. 59) are compared, the margin itself affords characters of considerable constancy and value for the recognition of species. In the subgenus *Littaea* a convenient basis of classification is found in the connection of the prickles by a horny

¹ Engelmann, Trans. Acad. Sci. St. Louis, vol. 3, 1875, p. 294; Bot. Works, 1887, p. 302.

detachable border in species like *A. lophantha*, or the fibrous shredding away of the margin in such species as *A. filifera*; and a considerable number of euagaves, such as *A. atrovirens*, are marked by a partial hardening of the edge, so that the prickles are connected by it, at least near the end of the leaf. The Antillean groups do not present any of these characters, but a large part of the species described in the present paper have the leaf margin of such a texture that in maturity it dries into a parchment-like border, either for a short distance below the end spine or throughout. In some species, especially of the Caribaeae, this border is conspicuously red during the early life of the leaf, and the original leaf description of *A. Karatto* has been misunderstood because it included mention of such a marginal coloration.

INFLORESCENCE.¹

Apart from the very obvious difference between the spicate inflorescence of *Littaea* and the paniculate inflorescence of *Euagave*, obscured in such representatives of the former subgenus as *Agave utahensis*² and *A. Engelmanni*,³ the relative elongation of the scape below the flower cluster shown when the long-stalked panicle of *A. Cocui* (pl. 6) is compared with the nearly sessile panicle of *A. Legrelliana* (pl. 60) or *A. Underwoodii* (pl. 68) is generally, if not constantly, characteristic. This is also true, with reasonable limitation, of (a) the crowding or separation of the scape bracts, dependent on the greater or less lengthening of internodes; (b) their breadth of form (*A. Trankeera*, pl. 25, and *A. Eggersiana*, pl. 31), a feature which is not always the result of difference in diameter in the scape and attendant width of their bases; and (c) their erect or spreading direction. Subject also to limitation, but diagnostic, are the differences in the length of the panicle branches and the consequent shape of the inflorescence shown by *A. Underwoodii* (pl. 68) and *A. missionum* (pl. 74). The most characteristic differences in the inflorescence, however, lie in the greater or less branching and extension of the panicle branches, which is evident when such forms as *A. Willdingii* or *A. Nashii* (pls. 93 and 101) and *A. Legrelliana* (pl. 60) are contrasted. The relative length of the pedicels in which these branches end either accentuates (*A. Legrelliana*, pls. 60 and 61) or diminishes (*A. Willdingii*, pls. 93 and 94) the separation of the flowers, and can in general be depended on in the segregation of species.

FLOWERS.⁴

In the flowers themselves, which are much frequented by insects and birds of several groups, differences in color and odor are often very marked, as when the greenish fetid flowers of *Agave sisalana* are compared with the yellow pumpkin-scented flowers of *A. Eggersiana* or the orange-throated flowers of *A. Legrelliana* or *A. antillarum*. Unfortunately such characters as odor are not preserved in herbarium specimens, and the color of the flowers may be lost in drying them. Generally, size, shape, and proportion of the flowers of a plant are counted on as being fairly constant. Perhaps this is as true in *Agave* as in most genera, and such differences sufficiently distinguish the small, short-stamened flowers of *A. Willdingii* (pl. 94), the rather large, long-stamened flowers of *A. fourcroydes* (pl. 112) with urceolately contracted tube, and the very large conical-tubed flowers of *A. Legrelliana* (pl. 61). Neither size nor proportion is satisfactorily limited, however, and in flowers with an inferior ovary, such as these, the form and measurements of the germen and its proportion to other parts of the flower have to be accepted with caution, as possibly influenced by the age of the flower or the time that has elapsed since fertilization was effected. Measurements of the flower are further dependent very largely on its freshness or the manner in which it has been preserved, and though well-pressed flowers may give measurements closely comparable with those of fresh flowers, information of this kind derived from withered flowers like those shown on plate 40 is of only very general value.

One of the most useful floral characters in *Agave* is afforded by the height at which the filaments are inserted in its perianth tube. Engelmann, who first applied this character com-

¹ Engelmann, Trans. Acad. Sci. St. Louis, vol. 3, 1875, p. 295; Bot. Works, 1887, p. 302.

² Pop. Sci. Mo., vol. 28, 1886, p. 11, fig. 9.

³ Rept. Missouri Bot. Gard., vol. 3, 1892, pl. 55.

⁴ Engelmann, Trans. Acad. Sci. St. Louis, vol. 3, 1875, p. 297; Bot. Works, 1887, p. 303.

paratively, made effective use of it in differentiating the agaves of the United States. This difference in insertion of the filaments is very marked when a species like *Agave barbadensis* (pl. 38), where they are nearly in the throat, is compared with one like *A. sisalana* (pl. 114), where they become free at about the middle of the tube; but the stamens of *Agave* are in two series, and the two sets are commonly inserted at somewhat different heights in the tube, so that in closely related forms the fractional differences that may be observed are not readily specified or measured with trustworthy precision. In proportion as the bottom of the tube is flattened, also, the insertion of deep-seated filaments may appear to be lowered from the middle to the base. The absolute length of the filaments and their ratio to the length of the segments of the perianth seem to be fairly characteristic but subject to wide fluctuation; on the other hand, the style, which at first is short but, even after the maturity of its stigma, continues to grow indefinitely, can be relied on to a very slight extent only as affording specific characters. The anthers of related species are usually much alike in general and rather variable in particular.

FRUIT.¹

As in other groups of plants, the fruit and seeds afford characters of a fairly trustworthy character. Marked differences separate the large, broad, rather thick-walled capsules of *Agave Karatto* (pl. 15), the elongated, equally thick-walled capsules of *A. Dussiana* (pl. 29), the smaller, nearly round, thinner-walled capsules of *A. portoricensis* (pl. 78), and the small, round, almost papery capsules of *A. papyrocarpa* (pl. 97). Among the West Indian agaves there may be also marked differences in the shape of the base of the capsules (e. g., *A. portoricensis*, pl. 78, and *A. papyrocarpa*, pl. 97) and of their distal ends (e. g., *A. Dussiana*, pl. 29, and *A. indagatorium*, pl. 92), even when in size and general proportions they are comparable. Abundant material usually shows the constancy of such differences, but starveling fruits (*A. anomala*, pl. 66) here as elsewhere must be taken as uncharacteristic. The seed dimensions of such fruits are not to be depended on any more than the measurements of seeds from the extreme top or bottom of a normal capsule, though those from the middle of well developed fruits average up pretty uniformly; and the seeds may differ measurably in unrelated species (e. g., *A. Brittoniana*, pl. 98, and *A. angustifolia*, pl. 109). It must be questioned, until further material is secured, whether the small capsules of *A. Millspaughii* (pl. 88) or the narrow capsules of *A. cacozele* (pl. 90) and *A. Harrisii* (pl. 51), of which few and not obviously normal fruits have been observed, are as representative as those of some other species are known to be.

BULBILS.

The agaves first known to be bulbiferous, *Agave vivipara* and *A. sobolifera*, received their specific names because of this fact, and a good deal of confusion has crept into the literature of *Agave* through a misconception as to the constancy of bulbil formation in a given species and its prevalence through the genus. The Sisalanae are markedly bulbiferous, and yet *A. angustifolia*, which typically shares this trait with its near relatives, sometimes fails to produce bulbils when capsules are found abundantly (pl. 107), or defers their production to a period subsequent to the ripening of the seed. On the other hand, a few littaeas of the marginate and filiferous groups are known to be prolificously viviparous at the end of the spike above the latest flowers; *Agave attenuata* has been shown very recently to be freely bulbiferous sometimes; the lower part of the scape of regularly bulbiferous species like *A. barbadensis* may bear, in the axils of the bracts, dense masses of unusually shaped bulbils which develop into as unusual plants (pl. C); similar plantlets are often borne on the trunk of polycarpic littaeas or of the magueys when they have been prevented from flowering normally; and it may be unwise to consider the absence of inflorescence bulbils as of constant diagnostic value even in species like *A. atrovirens* and *A. picta*, which have not yet been reported to bear them.

When produced, the bulbils of one species are usually somewhat different from those of another, indeed those of widely distinct groups differ greatly; but their differences have been little utilized as yet for the characterization of species. However constant it may be, the

¹ Engelmann, Trans. Acad. Sci. St. Louis, vol. 3, 1875, p. 299; Bot. Works, 1887, p. 304.

marginal arming of their leaves is not even indicative of the condition that will prevail on the mature foliage, the essentially smooth-edged and the most prickly forms of *Agave sisalana* agreeing in having the bulbil leaves finely prickly on the margin.

TAXONOMIC APPLICATION.

The actual use of such differences as have been noted is more difficult than would at first sight seem probable. In trunk, leaves, inflorescence, flowers, fruit, seeds, and bulbils the exotic Sisalanae are easily differentiable from all of the agaves native to the West Indies, even the rigid-leaved Inaguenses; the latter, too, differ in habit, foliage, and flowers, and apparently in fruit, from the other endemic groups. Beyond this, except that the known Antillares are small-flowered and small-fruited, and, so far as known, bear their flowers rather densely clustered at the ends of the panicle-branches, even the principal groups into which the primal West Indian stock has become differentiated must be limited rather by various associations of characters than by modifications of any one fundamental character. Within each group the difficulties of classification are equally great because of the corresponding impossibility of selecting a basic series of successively subordinated characters. The capsules of *Agave papyrocarpa* and *A. tubulata* are much alike, but their flowers are very different (pls. 97, 99, and 100), and the same is true of *A. antillarum* and *A. Underwoodii* (pls. 43 and 71); on the other hand the capsules of *A. montserratensis* and *A. Dussiana* differ markedly, though their flowers are nearly alike (pls. 19 and 29). The rather close agreement between the flowers of *A. barbadensis* and *A. unguiculata* is attended by a totally different leaf-spine (pls. 35, 38, and 39); but nearly identical spines accompany very different flowers in *A. montserratensis*, *A. grenadina*, and *A. barbadensis* (pls. 18 and 19, 21, 35, and 38).

Though it is hard to separate the dissociated spines of *A. vivipara* and *A. Brittoniana* (pl. B), species which belong to different groups and could not otherwise be confused; and though the spine of *A. portoricensis* is as suggestive of one of the Caribaeae as that of *A. ventum-versa* is of one of the Antillanae, groups in which the spines are reciprocally shaped; the arming of the leaf appears, on the whole, to have changed less, in the differentiation of these plants, than have either flower or fruit, due allowance being made for discrepancies between spines of indeterminate development and the prickles of variously repand species, as well as for the occasional partial or all but entire abortion of the prickles which occurs with considerable fixity in *A. sisalana* and perhaps also in *A. anomala* among the Antillean species.

It is obviously impossible to arrange the species in a single series corresponding to their relationships. Since no existing group can be considered as the parent stock of the others, the groups are treated here in the sequence which, on the whole, affords the easiest transition from one to the other. In each group the species are so arranged as to bring together those which show the largest number of common characters, though this convenient sequence does not necessarily bring at the beginning or end of a given group the species which most closely resembles that of the adjoining group.

The specific descriptions here given might have been shortened by omission of characters common to groups of species, so as to save much space and with attendant facility in comparing the few differential characters of related forms; but experience has shown that such abbreviated diagnoses are so likely to be regarded as complete that they are scarcely permissible except in revisions of entire genera. When prepared for a partial or local revision like the present, they may become absolutely misleading if applied in the study of other forms, or, apart from rather full synoptical characters, even of the groups they are prepared for. In the following account, therefore, each species is as fully described in all essentials as the material at hand has made possible.

The Antillean species of *Agave* are so largely endemic that the references given under each of them are essentially complete, even for notices of it as a garden plant. If many familiar uses of such names as *A. vivipara* be missed from the citations given, it is because they pertain to other species and are of later application than the first use of these names as here employed. For the few species not limited to the islands, reference is made merely to the place of original publication, and to mention of it as Antillean.

SYNOPSIS.

Plants rarely suckering except in the first group. Leaves fleshy, usually curved. Endemic.

Leaves usually green.

Flowers rather large (40-80 mm. from base of ovary to tip of perianth). Panicle decompound. Seeds rather large (4-6 by 6-9 mm.).

Freely bulbiferous, not always fruiting. Prickles usually small.

Spine elongated, slender. Plants suckering. Venezuelan.....VIVIPARAE (p. 17).

Spine with stout involutely slit base, above this usually short and oblique. Plants not suckering.

CaribbeanCARIBAEAE (p. 21).

Freely fruiting, sometimes bulbiferous. Prickles usually rather large. Spine usually elongated. Antillean.....ANTILLANAE (p. 29).

Flowers rather small (30-45 mm.). Panicle branches rather simple. Seeds small (4-5 by 5-6 mm.). Prickles small. Spine usually elongated. Antillean.....ANTILLARES (p. 42).

Leaves usually gray. Flowers rather large (40-60 mm.). Panicle decompound. Seeds rather large (4-6 by 7-8 mm.). Spine elongated. Bahamian.....BAHAMANAE (p. 38).

Plants freely suckering. Leaves hard and straight, gray. Endemic.

Flowers rather small (35-50 mm.). Seeds small (4 by 5 mm.). Bahamian.....INAGUENSES (p. 45).

Plants freely suckering. Leaves hard and straight, at first gray or glaucous. Introduced.

Flowers rather large (40-65 mm.). Seeds large (7 by 8-10 mm.).....SISALANAE (p. 47).

Plates 1 to 13.

The map illustrates the Caribbean region, including the Gulf of Mexico and the Caribbean Sea. Key geographical features and islands labeled include:

- North America:** Florida, Bahamas (including Abaco, Beery I., Eleuthera, New Prov., Andros, Cat I., Watling I., Exuma, Long I., Acklin, Crooked I., and Marshagua).
- Central America and the Caribbean:** Cayman Islands, Cuba, Isla de Pinos, Jamaica, Haiti, and the Leeward Islands (including Antigua, Barbados, and others).
- South America:** Venezuela, Colombia, and Trinidad.
- Other Islands:** Puerto Rico, St. Thomas, St. John, St. Kitts, Nevis, Montserrat, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, St. Vincent, Barbados, Grenadines, and Tobago.

FIGURE 1.—Map showing distribution of the Viviparae.

Confined to the Leeward Islands and the adjacent Venezuelan mainland.

Leaves relatively broad (1: 3 or 4).

Plants and flowers rather small.

Leaves transiently glaucous; prickles slender, from small lunate bases..... *Agave vivipara*.

Leaves dull green; prickles heavily triangular, from large lunate bases..... *A. vicina*.

Plants and flowers rather large. Leaves glossy green; prickles acuminate deltoid or slender, from small half-round bases..... *A. Cocui*.

Leaves relatively narrow (1: 5 or 6).

Leaves acute.

Spine short..... *A. evadens*.

Spine long and slender; prickles from very large bases..... *A. petiolata*.

Leaves acuminate; spine acicular; prickles rather heavily triangular..... *A. Boldinghiana*.

Agave vivipara Linnaeus.

Plates A, B, and 1 to 3.

- Agave vivipara* LINNAEUS, Sp. Pl., vol. 1, p. 323, 1753; 2d ed., vol. 1, p. 461, 1762; 3d ed., vol. 1, p. 461, 1764, exclusive of Rumph citation.—ONOMATOLOGIA, vol. 1, p. 200, 1772.—MAWE, Dict. Gard., 1778.—?SALISBURY, Prodrusus, p. 247, 1796; ?Gen. Char. English Bot., pl. 79, 1806.—MOUTON-FONTENILLE, Tabl. Syst. Bot., vol. 2, p. 63, 1805, exclusive of Rumph citation.—SPRENGEL, Hist. Rei Herb., vol. 2, p. 139, 1808.—LINK, Enum. Pl., vol. 1, p. 334, 1821.—STEUDEL, Nomencl. Bot., p. 18, 1821; 2d ed., p. 37, 1841.—BERTOLONI, Giorn. Arcadico, vol. 21, p. 189, 1824.—SALM, Hort. Dyck., vol. 8, p. 308, 1834; Bonplandia, vol. 7, pp. 86 and 89, 1859, except for citation of Dillenius.—HERBERT, Amaryllidaceae, p. 128, 1837.—DON, Sweet's Hort. Britannicus, 3d ed., p. 705, 1839.—WINKLER, Vollst. Real-Lexicon, vol. 1, p. 44, 1840.—v. MARTIUS, Beitr. Nat. u. Lit. Gesch. Agaveen, p. 10, 1855.—OVIEDO, Hist. Gen. Indias, vol. 4, p. 601, 1855.—?KOCH, Wochenschr. Ver. Beförd. Gartenbau, 1860, p. 29; 1862, p. 198; Fl. des Jard., 1861, p. 120; Belgique Hort., 1862, p. 214; 1864, p. 303.—v. JACOBI, Hamburg. Gart. u. Bl. Zeit., 1864, pp. 459, 461, and 501; 1865, pp. 218 and 252; Versuch., pp. 6, 7, 17, 121, and 131, 1859, exclusive of the synonymy except the Salm (and Koch?) citations.—HEREMAN, Paxton's Bot. Dict., p. 18, 1868.—EICHLER, Jahrb. Berlin Gart., vol. 1, p. 173, 1881.—?CLOS, Viviparité, p. 7, 1900.—DRUMMOND and PRAIN, Bengal Bull., 1905, No 8, p. 33; Agric. Ledger, 1906, p. 109.—DRUMMOND, Rept. Missouri Bot. Gard., vol. 18, pp. 27 and 58, 1907.
- ?*Aloe americana* minor. MÜNTING, Aloidarum, p. 12, pl., 1680; Phytographia, p. 20, fig. 93, 1702, 1713, and 1727.—RAY, Hist. Pl., vol. 2, p. 1198, 1688.—BOERHAAVE, Index Alter Pl., vol. 2, p. 129, 1720 and 1727.
- Aloe americana* foliis parum dentatis. MORISON, Pl. Hist. Univ., pp. 414 and 418, § 4, pl. 22, fig. 9, 1680.
- Aloe americana* polygona. COMMELIN, Praelud. Bot., p. 65, pl. 15, 1703 and 1715—the prototype of the original *Agave vivipara* of Linnaeus.—TREW, Commerc. Norimbergae, 1744, p. 367.
- Aloe americana* fol. in obl. acul. abeunte minor. HERMANN, Parad. Batav. Prod., p. 305, 1689. (See BOERHAAVE, Index Alter Pl., vol. 2, p. 129, 1727.)
- Agave* fol. dent. spin. etc. FABRICIUS, Enum. Helmstadiensis, 2d ed., p. 13, 1763.
- Aloe vivipara* CRANTZ, Inst. Rei Herb., vol. 1, p. 466, 1766.
- Agave vivipara* REICHARD, Syst., vol. 2, p. 89, 1779, as to characters and Commelin citation.
- ?*A. Theometel* ZUCCAGNI, Roemer's Collectanea, vol. 1, pp. 138–139, pl. 3, 1809.—STEUDEL, Nomencl. Bot., p. 18, 1821.—ROEMER, Ensatae, p. 288, 1847.—KUNTH, Enum. Pl., vol. 5, p. 823, 1850.—v. JACOBI, Hamburg. Gart. u. Bl. Zeit., 1864, p. 500; 1865, p. 60; Versuch., pp. 16, 70, and 133, 1859.—?BAKER, Gard. Chron., new ser., vol. 8, p. 200, 1878; Handbook Amaryllid., p. 179, 1888.—?RICASOLI, Bull. Soc. Tosc. Ort., vol. 3, p. 238, 1878.—?HEMSLEY, Biol. Centrali-Americana, vol. 3, p. 350, 1882–1886.—?DRAGENDORFF, Heilpfl., p. 134, 1898.—?NICHOLSON, Dict. Suppl., vol. 1, p. 28, 1892–3.—?SEGURA, El Maguey, 4th ed., p. 88, 1901.—DRUMMOND and PRAIN, Bengal Bull., 1905, No. 8, pp. 42, 51, 58, and 189; Agric. Ledger, 1906, pp. 115, 118, and 125–127.
- ?*A. americana* *Theometel* TERRACCiano, Primo Contr., p. 41, 1885.
- Agave* No. 3, HAMELBERG, Verslag Geschied-, Taal-, Land-, en Volkenkundig Genootsch., Curaçao, vol. 2, p. 24, 1898.

Nearly acaulescent, suckering. Leaves somewhat transiently glaucous, at length rather glossy green, very broadly lanceolate, subacuminate, flatly concave, 12–20 by 40–60 cm.; spine red-brown, smooth, polished toward the end, somewhat flexuous, triquetrously acicular, narrowly round-grooved to the middle and involute below, 3–4 by 25–30 mm., shortly decurrent; prickles 10–15 mm. apart, 3–4 mm. long, commonly upcurved above and recurved below, slender from lunate bases often on green prominences, the intervening margin a little concave. Inflorescence scarcely 3 m. high, the upper half or more narrowly oblong-paniculate with ascending branches; bracts broadly triangular, imbricated; pedicels scarcely 5 mm. long. Flowers yellow, 40–45 mm. long; ovary 20–25 mm. long, about equaling the perianth, oblong; tube open, about 4 mm. deep; segments 4 by 15 mm., shorter than the ovary; filaments inserted a little below the throat, 30 mm. long, twice as long as the segments. Capsules broadly oblong, 25 by 30 mm., very shortly stipitate and beaked; seeds?. Freely bulbiferous.

Leeward Islands. The "koeki [cocui] indian" of Curaçao. The earliest named West Indian species of the genus.

Specimens examined: CURAÇAO (*Boldingh*, A 3, 5698, 1909; *Ecker*, 1909, 1910).

Agave vicina n. sp.

Plates 4 and 10.

Acaulescent, not suckering?. Leaves dull, very broadly oblanceolate, rather acute, openly concave, 15 by 50 cm.; spine gray-brown, smooth, polished only near the end, somewhat upcurved, conical, round-grooved below the middle and involute, 3-4 by 15-25 mm., decurrent and intruded into the green tissue dorsally; prickles 15-20 mm. apart, 4-8 mm. long, upcurved above and recurved below, rather heavily triangular, sometimes from very large half round green or drying prominences, the intervening margin often deeply concave. Inflorescence about 4 m. high, the upper third narrowly oblong-panicled with rather ascending branches; bracts broadly triangular, separated except at the base; pedicels scarcely 5 mm. long. Mature flowers, fruit, and bulbils unknown.

Leeward Islands. The "koeki spanjool" or "koekoe indian" of Aruba.

Specimens examined: ARUBA (*Boldingh*, 3, 5, 1910, the type).

Agave Cocui n. sp.

Plates 5 to 7.

A. americana HUMBOLDT, New Spain, vol. 2, p. 472, 1808; Neuspan., vol. 2, p. 71 (Stuttgart Ed.); Ansichten der Natur, 3d ed., vol. 2, p. 214, 1849; Views of Nature, p. 333, 1850; Travels, vol. 1, pp. 226, 275, 329, 444, 477, and 484; vol. 2, pp. 258 and 506, 1852.—HUMBOLDT, BONPLAND, and KUNTH, Nov. Gen. Sp., vol. 1, p. 297, 1815.—KUNTH, Syn. Pl. . . . Humboldt and Bonpland, vol. 1, p. 299, 1822.—OTTO, Allgem. Gartenzeit., vol. 12, p. 158, pl. 2, 1844.—ERNST, Journ. Bot., vol. 3, p. 281, 1865; vol. 5, p. 269, 1867; Familias . . . Venezuela, p. 26, 1881.—JONOW, Kosmos, vol. 17, pp. 188 and 193, 1885.

A. Morrisii var. WORSLEY, Distrib. Amaryll., p. 7, 1895.

Agave sp. THERESE VON BAYERN, Reisestudien, vol. 1, pp. 28-30, 1908.

Essentially acaulescent, suckering. Leaves transiently glaucous, soon green and glossy, broadly lanceolate, rather quickly acute or subacuminate, deeply and sometimes tortuously concave, plicate, 30 by 110 cm.; spine red-brown, smooth, triquetrously conical, shallowly grooved below the middle and involute below, 3-4 by 15-25 (or even 5 by 30) mm., decurrent and dorsally intruded into the green tissue; prickles red-chestnut, usually 10-20 mm. apart, 3-4 mm. long, mostly upcurved above and recurved below, acuminate triangular or from lunate bases on green or at length hardening prominences, the intervening margin concave. Inflorescence 9 m. high, the upper half narrowly oblong-paniculate with nearly horizontal branches; bracts narrowly triangular, not imbricated, at length recurved; pedicels about 5 mm. long. Flowers yellow, 50-60 mm. long; ovary 25-30 mm. long, about equaling the perianth, rather oblong; tube openly conical, 5-6 mm. deep; segments 5-6 by about 20 mm., shorter than the ovary; filaments inserted a little below the throat, 40-45 mm. long, about twice as long as the segments. Capsules oblong, 20-25 by 40-50 mm., little stipitate or beaked; seeds 5-6 by 7-9 mm. Freely bulbiferous.

Venezuela. The "cocui" of the coast region about Carácas and Cumaná, extending into the interior perhaps as far as the confluence of the Apure and Orinoco rivers.

Specimens examined: VENEZUELA. About Carácas (*Gollmer*, June 9, 1853; *Piña-Maya Sisal Company*, 1906; *Ustariz*, 1909; *Zuloaga*, 1910, the type). La Guayra (*Boldingh*, 1910). Guanta (*Boldingh*, 1910).

This *Agave* is now known as "cocui," but Humboldt called it "cocuiza" and applied the name "cocui" or "maguey de cocui" to the *Furcraea* of the Venezuelan coast region which is now called "cocuiza."¹ The "pitte" of which bridge ropes are sometimes made in the Andes, which Humboldt² believed to be secured from the roots of *Agave americana*, as he called *A. Cocui*, is more likely to be the leaf fiber of a *Furcraea*, of which Andean species are known.

¹ *Furcraea Humboldtiana* Trelease, Ann. Jard. Bot. Buitenzorg, Suppl. vol. 3, p. 907, pl. 38, 1910.

² Rech. America, vol. 2, p. 72, pl. 13, 1814: The bridge at Penipé.

In agreement with Humboldt's Venezuelan usage, on Puerto Rico the native *Agave* is commonly called "cocuiza," while the associated *Furcraea* is known as "maguey." The practice of roasting and eating the trunks of *Agave*, which Oviedo found prevalent in the Venezuelan region—comparable with the "mezcal" use made of other species in the Mexican table-land—still persists, and has led to a curious transformation of the native word "cocui" into the Dutch "koeki" on Curaçao, where, as Dr. Boldingh tells me, the sweet roasted substance of *A. vivipara* is known as "koeki indian" or Indian cake.

Though not known to occur on even the coastwise islands, *A. Cocui* is included in this account for completeness, since it is the only known continental representative of the Viviparae, as well as the only described *Euagave* native to South America. It also promises unusual historical interest for students of its genus because it is the plant which, on the Arayan mainland, furnished Oviedo¹ with the name "maguei" or "maguey" which the Spaniards have fixed permanently as a popular generic name for the larger agaves that in Mexico were known as metl, the Haitian "maguey" of the same writer apparently being *A. antillarum*. The word maguey, judging from Oviedo's account, designated the flower stalk or articles made from it as well as the plant itself; and in Venezuela the scape, which would be called a "quiote" in Mexico, is still called a "maguey," as I am informed by Sr. Zuloaga.

Agave petiolata n. sp.

Plate 8.

Agave lurida HAMELBERG, Verslag. Geschied-, Taal-, Land-, en Volkenkundig Genootsch., Curaçao, vol. 2, p. 24, 1898.

Caulescent, the trunk under 1 m. high, suckering?. Leaves blue-glaucous, lanceolate, rather abruptly contracted into a long neck at base, gradually acute, about 17 by 110 cm.; spine chestnut, granular-roughened below, smooth and polished toward the end, more or less flexuous, acicular, round-grooved to or beyond the middle, 3-4 by 25-60 mm., shortly decurrent; prickles purplish chestnut, 15-30 or even 50 mm. apart, 5 mm. long, straight or variously curved, narrowly triangular from half-round bases 5-10 mm. wide sometimes raised on abrupt green prominences between which the margin is nearly straight. Inflorescence paniculate; pedicels scarcely 5 mm. long. Flowers 35-40 mm. long; ovary 15 mm. long, shorter than the perianth, fusiform; tube open, 5 mm. deep; segments 3 by 15 mm., about equaling the ovary; filaments inserted nearly in the throat, 30 mm. long, twice as long as the segments. Fruit and bulbils unknown.

Leeward Islands. Known only from Curaçao.

Specimens examined: CURAÇAO (*Boldingh*, A 8, 1909, the type; 5624, 1910; *Ecker*, 1909).

A curious plant, in arming suggesting some of the Mexican species grown for pulque.

Agave evadens n. sp.

Plates 9, 10, and 116.

? *A. polyacantha* BAKER, Handbook Amaryllid., p. 183, 1888.—HART, Rept. Trinidad Gard., 1890 (see Gard. Mag., vol. 35, p. 160, 1892), as to Trinidad and the Bocas Islands.

? *A. polyantha* DODGE, Rept. Fiber Invest. (U. S. Dept. Agric.), No. 9, p. 5, 1897.

? *A. vivipara* HART, Rept. Trinidad Gard., 1890.

? *A. americana* JOHNSTON, Proc. Boston Soc. Nat. Hist., vol. 34, pp. 197 and 274, 1909.

Shortly caulescent, somewhat suckering?. Leaves narrowly oblanceolate, gradually acute, openly concave or somewhat plicate or with inrolled margins above; spine apparently short and rather stout; prickles rather close together, the intervening margin nearly straight. Inflorescence slender, laxly paniced at the end only, with few ascending few-flowered branches. Pedicels rather slender, scarcely 10 mm. long. Flowers about 45 mm. long; ovary 25 mm. long, somewhat exceeding the perianth, oblong-fusiform; tube open, about 4 mm. deep; segments 4 by 20 mm., shorter than the ovary; filaments inserted nearly in the throat, 35 mm. long, scarcely twice as long as the segments. Fruit and bulbils unknown.

Leeward Islands. The "langue à boeuf" of Trinidad and perhaps of Tobago and the Bocas Islands.

¹ Hist. Gen. Indias, vol. 4, p. 600, published only in 1855.

An elusive form known to me only from the photographs here reproduced, and dissociated flowers, and therefore very inadequately characterized, but shown by these to be distinct and evidently one of the Viviparae. Intermediate in foliage between *A. Cocui* of the adjacent mainland and *A. Boldinghiana* of the more western islands, but with smaller inflorescence than either; much narrower leaved than the correspondingly small *A. vivipara* and *A. vicina*.

Specimens examined: TRINIDAD (*Crueger, 1333*, Herb. Urban, flowers only, the type). Isolated flowers collected on Margarita (*Miller and Johnston, 243*, 1901), and the corresponding reference, may represent this species.

Agave Boldinghiana n. sp.

Plates 11 to 13.

Nearly acaulescent, suckering. Leaves green, transiently somewhat glaucous, narrowly oblanceolate, subacuminate, openly concave, 15 by 100 cm.; spine red-brown, smooth, polished toward the end, somewhat upcurved-flexuous, acicular, grooved and usually involute toward the base, 2-4 by 25-30 mm., shortly decurrent; prickles from scarlet becoming chestnut, mostly 10-15 mm. apart, 4-7 mm. long, often irregularly upcurved above and recurved below, heavily triangular or from lunate bases, the intervening margin rather straight. Inflorescence about 5 m. high, the upper half or less narrowly oblong-paniculate with few distant ascending branches; bracts narrowly triangular, rather distant, appressed; pedicels 5 mm. long. Flowers golden, 45 mm. long; ovary 20-25 mm. long, equaling the perianth, broadly fusiform; tube conical, about 7 mm. deep; segments 4 by 15 mm., shorter than the ovary; filaments inserted nearly in the throat, about 35 mm. long and twice as long as the segments. Fruit unknown. Freely bulbiferous.

Leeward Islands. Called "koeki spanjool," or sometimes "koeki indian."

Specimens examined: CURAÇAO (*Boldingh, A2*, 1909, the type; *Ecker, 1909*, 1910). BONAIRE (*Boldingh, 7456*, etc., 1910, with more crowded and smaller prickles, perhaps varietally separable).

CARIBAEAE.

Plates 14 to 40.

Rather large not cespitose acaulescent plants with numerous suberect fleshy usually green leaves, with the mostly short spine or mucro continued at base by thick hardened involutely slit leaf tissue which is papery-decurrent and usually deeply intruded dorsally into the parenchyma, and small or minute rather close-set prickles; somewhat contracted but ample panicles often with ascending branches; medium-sized or fairly large yellow or golden scarcely congested flowers; abundant inflorescence bulbils; and, when present, rather large stipitate capsules and rather large seeds.

Confined to the Caribbees and Leeward Islands. Two southern species (*Agave ventum versa* and *A. unguiculata*) are aberrant.

Spine with large inrolled base.

Flowers moderate (scarcely 65 mm.) with rather shallow (5-10 mm.) tube.

Spine obliquely mucronate or recurved.

Prickles moderate.

Leaves green.

Spine base oblong; mucro very short.....*Agave Karatto.*

Spine base conical; mucro moderate.....*A. Van Grolae.*

Spine recurved, scarcely mucronate.....*A. nevidis.*

Leaves gray; mucro rather long.....*A. montserratensis.*

Prickles rather small. Perianth short.....*A. medioxima.*

Prickles minute. Ovary short.....*A. grenadina.*

Spine conical rather than mucronate.

Prickles moderate.

Spine very slenderly pointed, rather recurved.....*A. Scheurmaniana.*

Spine moderate, usually upcurved.

Capsules broadly oblong.

Capsules very broad. Pedicels long.....*A. obducta.*

Capsules and pedicels moderate.....*A. Trankeera.*

Capsules narrowly oblong. Pedicels long.....*A. Dussiana.*

Agave Karatto Miller.

Plates B, 14, and 15.

Agave Karatto MILLER, Gard. Dict., 8th ed., 1768; Abr. Dict., 1771; Dict. Jard., vol. 1, pp. 57 and 61, 1785.—Onomatologia, vol. 1, p. 202, 1772.—HAWORTH, Syn. Pl. Succ., p. 72, 1812.—STEUDEL, Nomencl. Bot., p. 18, 1821.—DON, Sweet's Hort. Britannicus, 3d ed., p. 705, 1839.—HEREMAN, Paxton's Bot. Dict., p. 18, 1868.—BAKER, Handbook Amaryllid., p. 167, 1888.—Kew Hand List Tend. Monocot., p. 113, 1897.—SEGURA, El Maguey, 4th ed., p. 59, 1901.—Agric. News, vol. 5, p. 61, 1906, as to St. Kitts.—TRELEASE, Wiesner Festschr., p. 333, 1908.

Agave foliis longis erectis, etc. MILLER, Gard. Dict., No. 6, 1759.

A. Karrata MAWE, Dict. Gard., 1778.

A. Karatta LETTSOM, Hort. Uptonensis, p. 16, 1781.

? *A. americana* β AITON, Hort. Kewensis, vol. 1, p. 471, 1789.—AITON, Jr., Hort. Kewensis, 2d ed., vol. 2, p. 301, 1811.—MARTYN in Miller's Gard. Dict., 1797.—DRUMMOND and PRAIN, Bengal Bull., 1905, No. 8, p. 47. Haworth, Syn. Pl. Succ., p. 72, 1812, did not recognize Miller's plant in this Aiton variety, though neither he nor Schultes assigns any place to the latter, which, if not this, may have been *A. barbadensis*.

? *A. americana* FAHLBERG, Nya Handl. Vetensk. Acad., 1793, p. 184. (See REUSS, Repert. Comment. Soc. Lit., vol. 2, p. 70, 1802.)

? *A. vivipara* DE CANDOLLE, Cat. Pl. Hort. Bot. Monspeliensis, p. 75, 1813; Pl. Hist. Succ. (Hist. Pl. Grasses), pl. 180, 1829.—DRUMMOND, Rept. Missouri Bot. Gard., vol. 18, p. 27, 1907.

A. Keratto HAWORTH, Syn. Pl. Succ., p. 78, 1819.—SPRENGEL, Syst. Veg., vol. 2, p. 79, 1825.—SCHULTES, Syst. Veg., vol. 7, p. 727, 1829.—HERBERT, Amaryllidaceae, p. 128, 1837.—DIETRICH, Syn. Pl., vol. 2, p. 1192, 1840.—STEUDEL, Nomencl. Bot., 2d ed., p. 36, 1841.—ROEMER, Ensatae, p. 291, 1847.—KUNTH, Enum. Pl., vol. 5, p. 821, 1850, as to the Miller description and locality.—GRISEBACH, Fl. British West Indian Islands, p. 582, 1864.—DRUMMOND and PRAIN, Bengal Bull., 1905, No. 8, pp. 52, 65, 71, 91, and 185; Agric. Ledger, 1906, pp. 128, etc.

Agave sp. Agric. News, vol. 6, p. 133, 1907, as to St. Kitts.

Acaulescent, not caespitose. Leaves green, rather glossy, lanceolate, acute, concave above, 20 by 150 cm.; spine black-chestnut, smooth, polished at tip, mostly recurved-mucronate, 3–4 mm. long, with dull dark rather oblong involute basal thickening 6 by 10–15 mm., decurrent, deeply intruded into the green tissue dorsally; prickles 5–15 or 20 mm. apart, 2–3 mm. long, straight or variously curved or reflexed, triangular, sometimes with lenticular bases, the intervening at first reddish margin nearly straight. Inflorescence 5–6 m. high, the upper third or more oblong-paniculate with spreading branches; bracts deltoid, approximated, subappressed; pedicels scarcely 10 mm. long. Flowers golden yellow, 60–65 mm. long; ovary 30–35 mm. long, about equaling the perianth, subfusiform; tube openly conical, 7 mm. deep; segments 5 by 22 mm., shorter than the ovary; filaments inserted a little below the throat, 40–45 mm. long, nearly twice as long as the segments. Capsules broadly oblong, 20 by 45 mm., stipitate and somewhat beaked; seeds 5–6 by 8 mm. Freely bulbiferous.

Caribbees. The "karatto," "karatá," "corita," or "coryata" of St. Kitts. The earliest named species of the group.

Specimens examined: ST. KITTS, the type island (Britton, 344, 1901; Shepherd, 1908, 1910).

Aside from Mr. Baker's redescription in 1888, the authentic garden literature of this species consists in repetitions of Miller's account; and there is no clear evidence that it occurred in Europe after about his time until it was received at Kew from St. Kitts in 1888. Salm-Dyck's *Karatto* of 1834 was subsequently recognized by him¹ as being *mexicana* or *Vera Cruz*; and what he then called *Keratto*, in this being followed by Jacobi, was segregated by Mr. Baker in 1878 under the name *Salmodyckii*, and from the description appears to have been a form of *polyacantha*. Misled, as Mr. Baker was later, by supposing that the red margin ascribed to the leaves was comparable with the horny detachable margin of *lophantha* or *heteracantha*, which he apparently knew in authentic plants, Koch in 1860 almost positively misidentifies *Karatto* with one or the other of these marginate Mexican *Littaeas*.

¹ Bonplandia, vol. 7, 1859, p. 88.

Agave Van Grolae n. sp.

Plates 16 and 17.

Fourcroya gigantea BOLDINGH, Fl. Dutch West Indies, vol. 1, p. 38, 1909.

Aspect of *A. Karatto*. Leaves transiently glaucous or slightly gray, at length somewhat glossy green, lanceolate, gradually acute, often somewhat plicate, as much as 200 cm.; spine with compressed-conical mostly upcurved involute base measuring 5-7 by 10-15 mm. and recurved apiculus 2 mm. long; prickles 5-10 mm. apart, 2 mm. long, straight or variously curved, triangular, lenticularly thickened at base, the intervening margin nearly straight. Inflorescence about 5 m. high, the upper third or more oblong-paniculate with spreading branches; bracts deltoid, approximated, subappressed; pedicels scarcely 10 mm. long. Flowers golden yellow, 45-55 mm. long; ovary about 25 mm. long, rather shorter than the perianth, subfusiform; tube openly conical, 7 mm. deep; segments 5 by 22 mm., nearly as long as the ovary; filaments inserted a little below the throat, 35 mm. long, about one-half longer than the segments. Capsules oblong, light gray, 20 by 40 mm., stipitate and beaked; seeds 5 by 7 mm. Freely bulbiferous.

Caribbees. The "karatá" of St. Eustatius.

Specimens examined: ST. EUSTATIUS (*Boldingh*, 1909; *Mrs. Van Grol*, 1909, 1910, the type).*Agave nevidis* n. sp.

Plate 22.

Aspect of *A. Karatto*. Spine conical awl-shaped, with rather recurved involute base measuring 4-5 by 10 mm. and tapered rather than apiculate tip about 3 mm. long; prickles 10-15 or 20 mm. apart, 2 mm. long, triangular rather straight, lenticularly thickened at base, the intervening margin nearly straight. Flowers, fruit, and bulbils unknown.

Caribbees. The "karatá" of Nevis.

Specimens examined: NEVIS (*Maloney*, 1910, the type).*Agave montserratensis* n. sp.

Plates B, 18, and 19.

Agave sp. SHAFER, Journ. New York Bot. Gard., vol. 8, p. 83, 1907.

Acaulescent, not cespitose. Leaves slightly grayish deep green, transiently blue-glaucous, then rather glossy, oblong-lanceolate, somewhat valliculate above, abruptly or gradually acute, 15 by 175 cm.; spine conical awl-shaped, strongly recurved with heavy involutely thickened base 6 by 10-15 mm. and slender cusp; prickles slender, usually 2-3 or even 5 mm. long and recurved-appressed in the middle, somewhat lenticular at base. Inflorescence paniculate; pedicels 15-20 mm. long. Flowers yellow, 60-65 mm. long; ovary 30 mm. long, rather shorter than the perianth, oblong-fusiform, slightly contracted shortly above the base; tube open, about 8 mm. deep; segments 7 by 25 mm., nearly as long as the ovary; filaments inserted a little below the throat, 40-50 mm. long, nearly twice as long as the segments. Capsules broadly oblong, 20 by 45 mm., stipitate and somewhat beaked; seeds about 5 by 8 mm. Bulbils unknown.

Caribbees. Montserrat.

Specimens examined: MONTSERRAT (*Robson*, 1908-1909, several collections, No. 1 taken as the type).*Agave medioxima* n. sp.

Plate 20.

A. americana GRISEBACH, Fl. British West Indian Islands, p. 582, 1864; Geogr. Verbr. Pfl. Westindiens, p. 49, 1865.—URBAN, Symb. Antillanae, vol. 4, p. 152, 1903.—All as to Dominica.

Aspect of *A. Karatto*. Leaves green and glossy, very slightly and evanescently glaucous beneath, lanceolate, rather gradually and very concavely acute, 15 by 125 cm. or more; spine nearly black, smooth, rather dull, recurved-mucronate or with oblong-conical involute light

brown basal thickening, 5-6 by 15 mm., decurrent and dorsally intruded into the green tissue; prickles red to chestnut, about 5 mm. apart, scarcely 1 mm. long, straight, or those below the middle twice as long and recurved, narrowly triangular, often from lenticular bases, the intervening reddish margin straight and often minutely denticulate. Inflorescence paniculate; pedicels 15-20 mm. long. Flowers golden, about 60 mm. long; ovary 30-40 mm. long, about one-half longer than the perianth, subfusiform; tube openly conical, 8 mm. deep; segments 7 by 18-20 mm., about half as long as the ovary; filaments inserted nearly in the throat, 35 mm. long, scarcely twice as long as the segments. Fruit unknown. Bulbiferous.

Caribbees. Dominica.

Specimens examined: DOMINICA. Grand Savanah (Jones, 1910, the type).

Agave grenadina n. sp.

Plate 21.

Aspect of *A. Karatto*. Leaves deep green, at first slightly glaucous, then glossy, broadly lanceolate, deeply concave below when young, gradually acute or rather blunt, 25-30 by 200 cm.; spine brown or blackish, smooth, somewhat glossy, recurved-mucronate, with darkening stoutly conical involute basal thickening 5-8 by 15 mm., decurrent and deeply intruded into the green tissue dorsally; prickles about 10 mm. apart, 1-2 mm. long, little curved, triangular from small lenticular bases, the at first reddish intervening margin straight. Inflorescence 8 m. high, the upper half paniculate; bracts deltoid, subimbricated, appressed. Flowers orange, about 60 mm. long; ovary 30 mm. long, equaling the perianth, fusiform; tube broad and shallow, 5 mm. deep; segments 6 by 25 mm., not as long as the ovary; filaments inserted nearly in the throat, 45 mm. long, nearly twice as long as the segments. Not known to bear capsules. Freely bulbiferous.

Caribbees. Grenada, plentiful at only one place, a sandy dry estate near the sea (Anstead).

Specimens examined: GRENADA (Anstead, C/29/1908, the type).

Agave Scheuermaniana n. sp.

Plate 22.

? *A. americana* GRISEBACH, Syst. Unters. Veg. Karaiben, p. 124, 1857.—As to St. Bartholomew.

Agave sp. MORRIS, Kew Bull., 1891, p. 130; Add. Ser., vol. 2, p. 275, 1901.

Aspect of *A. Karatto*. Leaves grayish green, from dull becoming rather glossy, lanceolate, gradually acute, 20 by 150-175 cm.; spine rather dark, slenderly awl-shaped, gently curved, with subconical base light brown below, 4-5 by 15-20 mm.; prickles brownish, 10-25 mm. apart, about 2 mm. long, mostly somewhat recurved or even closely appressed-retrorse, narrowly triangular from lenticular bases, the intervening reddish margin nearly straight or shallowly concave. Inflorescence paniculate; pedicels 7-10 mm. long. Flowers and fruit unknown. Bulbils freely produced, dull grayish green, with minute denticles between the slender prickles of their leaves.

Caribbees. St. Martin, Anguilla, and perhaps St. Bartholomew.

Specimens examined: ST. MARTIN (Scheuerman, 1910, the type). ANGUILLA (Owen, 1910, 1911.)

Agave obducta n. sp.

Plates B, 23, and 24.

A. americana GRISEBACH, Syst. Unters. Veg. Karaiben, p. 124, 1857; Fl. British West Indian Islands, p. 582, 1864.—

URBAN, Symbol. Antillanae, vol. 4, p. 152, 1903.—All as to Antigua.

A. Keratto MORRIS, Kew Bull., 1891, p. 113; Add. Ser., vol. 2, p. 275, 1901.—As to Antigua.

Illustrations, without name, occur in STARK, Hist. Barbados, etc., facing page 24, and Rept. Antigua Bot. Sta., 1906-7, p. 36, fig. 4.

Aspect of *A. Karatto*. Leaves narrow, green, dull, slightly gray or transiently a very little glaucous; spine mostly upcurved with conical involute or rather open base measuring

5 by 10–15 mm.; prickles usually 10–15 mm. apart, 2–3 mm. long, straight or variously curved, narrowly triangular, often lenticularly thickened at base, the intervening at first often reddish margin nearly straight. Inflorescence paniculate; pedicels variable. Flowers 60–65 mm. long; ovary 30 mm. long, a little longer than the perianth, oblong-fusiform; tube openly conical, 8 mm. deep; segments 5 by 25 mm., shorter than the ovary; filaments inserted a little below the throat, 45–50 mm. long, twice as long as the segments. Capsules broadly oblong, 25 by 45 mm., very shortly stipitate, beaked; seeds 4–6 by 7–8 mm. Freely bulbiferous.

Caribbees. Antigua, and to be sought on Barbuda.

Specimens examined: ANTIGUA (*Wulschlägel*, 564; *Officers of Botanic Station*, 1903; *Archer*, 1908; *Jackson*, 1908, the type).

Agave Trankeera n. sp.

Plates 25 to 28.

? *A. polyacantha* HAMELBERG, Verslag Geschied-, Taal-, Land-, en Volkenkundig Genootsch. Curaçao, vol. 2, p. 23, 1898.

Acaulescent or in age with a short trunk, not cespitose. Leaves dark green, dull and very slightly glaucous when young, lanceolate, gradually acute, concave, sometimes plicate or trough-like toward the end, 18–20 by 150 cm. or more, sometimes refracting in age; spine blackish brown or grayish, smooth, dull, rather upcurved, conical, with broadly conical slit or inrolled basal thickening 4–7 by 10 mm., decurrent and dorsally intruded into the green tissue; prickles mostly about 10 mm. apart, scarcely 2 mm. long, usually straight, triangular from somewhat lenticular bases, the intervening often reddish margin slightly concave. Inflorescence 6–7 m. high, the upper half rather broadly oblong-paniculate with moderately ascending branches; bracts broadly triangular, approximated, mostly appressed; pedicels 10 mm. long. Flowers orange, about 60 mm. long; ovary 30 mm. long, about equaling the perianth, oblong; tube open, about 8 mm. deep; segments 8 by 25 mm., shorter than the ovary; filaments inserted nearly in the throat, 45 mm. long, about one-half longer than the segments. Capsules broadly oblong, 25 by 40 mm., shortly stipitate and beaked; seeds unknown. Freely bulbiferous.

Leeward Islands. The “pita de Trankeera” of Curaçao, where, as is true of the native species on Barbados, it is everywhere used in hedgerows. The only species of its group known outside the Caribbees.

Specimens examined: CURAÇAO (*Boldingh*, 7, A15, b, k, 1909, the type; *Ecker*, 1909, 1910). BONAIRE (*Boldingh*, 7457, 1910). ARUBA (*Boldingh*, 1, 2, 1910).

The specimens from Bonaire and Aruba have the spine-base usually 15–20 mm. long and their marginal prickles are smaller. They may prove distinct from the Curaçao plant, if not from one another, when better known.

Agave Dussiana n. sp.

Plates 28 and 29.

A. americana GRISEBACH, Fl. British West Indian Islands, p. 582, 1864; Geogr. Verbr. Pfl. Westindiens, p. 49, 1865.—DUSS, Ann. Inst. Colon., Marseille, vol. 3, p. 557, 1897.—URBAN, Symbol. Antillanae, vol. 4, p. 152, 1903.—All as to Guadeloupe and perhaps the immediately adjacent islands.

A. antillarum BALLET, Guadeloupe, vol. 1, p. 458, 1890.—MAZÉ, Contr. Fl. Guadeloupe, p. 110, 1892.

Aspect of *A. Karatto*. Leaves at first grayish green then somewhat glossy, lanceolate, gradually acute, concave, 20–40 by 100–160 cm.; spine blackish, smooth, rather glossy, recurved, conical, with broadly conical inrolled base 4 by 5–7 mm., decurrent and dorsally intruded into the green tissue; prickles 5–10 mm. apart, 2 mm. long, recurved, narrowly triangular from somewhat lenticular bases, the intervening sometimes red or papery margin straight. Inflorescence 5–9 m. high, the upper third pyramidally paniculate, with subhorizontal branches; bracts deltoid, rather distant, at length reflexed; pedicels about 15 mm. long. Flowers about 65 mm. long; ovary 30–35 mm. long, little longer than the perianth, oblong-fusiform; tube conical, about 10 mm.

deep; segments 7-8 by 20 mm., two-thirds as long as the ovary; filaments inserted a little below the throat, 30-35 mm. long, one-half longer than the segments. Capsules light brown, narrowly oblong, 20 by 50 mm., stipitate and beaked; seeds 7 by 8 mm. Bulbils unknown.

Caribbees. The "karatá jaune," "langue à boeuf," or "salsepareille" of Guadeloupe (though the last two names seem likewise to refer to *Furcraea*); perhaps also, but very questionably, of the adjacent islands Désirade, Marie Galante, and Les Saintes.

Specimens examined: GUADELOUPE. Port Louis (*Duss*, 3961, 1898, the type). Cultivated at Basse Terre (*Mme. Carrère*, 1911).

Panicle characters are based on the description by Father Duss, which seems to have been drawn from local plants. The herbarium material (comprising bract, panicle-branches, flowers, capsules, and seeds) though ample, is confused in labeling. Of No. 2136, from Martinique, only a few short-tubed flowers are recognizable as belonging to *A. caribaeicola*, but unmistakable flowers and capsules of the present species are found as of this number and locality. No. 53, labeled as from Antigua, is obviously the same, the flowers differing markedly in proportion from those of *A. obducta* as represented in the Grisebach herbarium, for the privilege of figuring which I am greatly indebted to Professor Peter of Göttingen.

Agave caribaeicola n. sp.

Plate 30.

A. caribaea BAKER, Handbook Amaryllid., p. 190, 1888.—SEGURA, El Maguey, 4th ed., p. 116, 1901.—Both as to Hahn material.

A. americana DUSS, Ann. Inst. Colon., Marseille, vol. 3, p. 557, 1897.—URBAN, Symbol. Antillanae, vol. 4, p. 152, 1903.—Both as to Martinique.

Aspect of *A. Karatto*. Spine brown, smooth, rather polished, slightly upcurved, with conical involute basal thickening 3-4 by 15-20 mm., somewhat decurrent and dorsally intruded into the green tissue; prickles about 5 mm. apart, scarcely 1 mm. long, triangular, straight, scarcely lenticular, the intervening margin nearly straight. Inflorescence paniculate; pedicels 15-20 mm. long. Flowers yellow, 60-70 mm. long; ovary 30-35 mm. long, about equaling the perianth, oblong-fusiform; tube open, about 8 mm. deep; segments 5-7 by 20-25 mm., shorter than the ovary; filaments inserted nearly in the throat, scarcely 40 mm. long, about one-half longer than the segments. Fruit and bulbils unknown.

Caribbees. The "langue à boeuf" of Martinique. *Pl.* 30.

Specimens examined: MARTINIQUE. Case Pilote (*Hahn*, 114, 1867-1870, the type).

The polycarpic plant known in gardens about twenty-five years ago as *A. caribaea*, and described under that name by Mr. Baker in 1877,¹ appears to have been a *Littaea* allied to or identical with the continental *A. chloracantha*. Such a plant is now cultivated as *caribaea*, but I find no evidence that it came from the West Indies.

Flowers of *A. kewensis*, as pictured in the Botanical Magazine (pl. 7532), agree almost exactly in size and details with the material of this species collected by Hahn, and the spine and prickles ascribed to *kewensis* by Jacobi (Versuch, pp. 197 and 242) are not dissimilar to those shown by Hahn's leaf; but flowers preserved in the Kew herbarium from the type plant match these dried flowers less closely, and the elongated leaf-rosette and narrow spreading bracts make it questionable whether *kewensis* is really a prior name for what is here called *caribaeicola*, though it is hard to place *kewensis* elsewhere than near or with this.

¹ *A. caribaea* J. VERSCHAFFELT, Cat., No. 17, p. 35, 1873-4; No. 18, p. 36, 1874; No. 19, p. 83, 1876-7.—DE SMET, Cat., No. 7, p. 28, 1874; No. 10, p. 32, 1877.—DELEUL, Rev. Hort., 1875, p. 204.—*A. caribaea* A. VAN GEERT, Cat., No. 71, p. 51, 1874-5.—GRIPH, Lyon Hort., 1879, p. 209.—*A. caribaea* DELEUL, Rev. Hort., 1875, p. 204.—BAKER, Gard. Chron., new ser., vol. 8, p. 683, 1877; Handbook Amaryllid., p. 190, 1888, as to foliage.—RICASOLI, Bull. Soc. Tosc. Ort., vol. 3, p. 302, 1878.—PEACOCK, List., p. 1, 1878.—VON DER HEIDEN, Cat., 1880, p. 11.—Kew Hand List Tend. Monocot., p. 109, 1897.—ROSE in Bailey, Cyclop. American Hort., vol. 1, p. 36, 1900.—?BRAUN, Pflanze, vol. 2, p. 233, 1906.—?DODGE, Rept. Fiber Invest. (U. S. Dept. Agric.), No. 5, p. 43, 1893.

Agave Eggersiana n. sp.

Plates 31 to 33.

A. americana GRISEBACH, Syst. Unters. Veg. Karaiben, p. 124, 1857.—EGGERS, Vidensk. Meddel. Naturhist. Foren., 1876, pp. 77, 79, and 155; Bull. U. S. Nat. Mus. No. 13, pp. 7 and 109, 1879.—MILLSAUGH, Publ. Field Mus. Bot., vol. 1, p. 480, 1902.—URBAN, Symbol. Antillanae, vol. 4, p. 152, 1903.—All as to St. Croix.
Agave sp. LLOYD, Journ. New York Bot. Gard., vol. 4, p. 195, 1903.—Agric. News, vol. 6, p. 133, 1907.—As to St. Croix.

Acaulescent, not cespitose. Leaves dull green, transiently a little glaucous, narrowly lanceolate, gradually acute, concave, 10–15 by 150 cm.; spine brown, smooth, rather glossy, usually somewhat upcurved, conical awl-shaped, often compressed from the side, with slender dull-brown involute basal thickening reaching 3 by 10–15 mm., decurrent for its length or more and dorsally intruded into the green tissue; prickles red-chestnut, usually 10 mm. apart, 1 mm. long, nearly straight, narrowly triangular from lenticular bases, the at first reddish intervening margin nearly straight. Inflorescence 5 m. high or more, the upper fourth narrowly oblong-paniculate with ascending branches; bracts narrowly triangular, rather distant, apreading or reflexed; pedicels 20–25 mm. long. Flowers yellow, pumpkin-scented, 50–60 mm. long; ovary 20–30 mm. long, scarcely equaling the perianth, oblong-fusiform; tube broadly open, 5–7 mm. deep; segments 5–8 by 20–25 mm., equaling the ovary; filaments inserted nearly in the throat, 45–50 mm. long, about twice as long as the segments. Not known to bear capsules. Freely bulbiferous.

Caribbees. The “karatá” or “corita” of St. Croix.

Specimens examined: ST. CROIX. Without locality (*Eggers*, 162, 1870). Bassin (*Ricksecker*, 282, 1896, the type; *Mrs. Ricksecker*, 104, 1897; *Trelease*, 12, 1907). A few individuals are cultivated at the castle, Charlotte Amalia, ST. THOMAS (*Trelease*, 13, 14, 1907; *Emanuel*, 1907, 1908).

No really spontaneous specimens have been seen.

Agave barbadensis n. sp.

Plates C, 34–38, 65, and 107.

Aloe barbadensis mitior, laete virescens et splendens. DILLENIUS, Hort. Elthamensis, vol. 1, p. 23, pl. 19, 1732; pl. 19, 1774.—TREW, Commerc. Norimbergae, 1744, p. 367.

Aloe americana muricata. HUGHES, Nat. Hist. Barbados, p. 223, 1750.

Agave americana DILLENIUS, Hort. Elthamensis Icon. et Nomina, text to pl. 19, 1774.—MAYCOCK, Fl. Barbados, p. 133, 1830.—SCHOMBURGK, Hist. Barbadoes, p. 588, 1848.—GRISEBACH, Syst. Unters. Veg. Karaiben, p. 124, 1857; Fl. British West Indian Islands, p. 582, 1864; Geogr. Verbr. Pfl. Westindiens, p. 49, 1865, as to Barbados.—DRUMMOND and PRAIN, Bengal Bull., 1905, No. 8, p. 46; Agric. Ledger, 1906, p. 122, as to Dillanian citation.

A. vivipara SALM, Bonplandia, vol. 7, p. 89, 1859.—As to Dillanian citation.

Furcraea tuberosa DRUMMOND, Rept. Missouri Bot. Gard., vol. 18, p. 35, 1907.—As to Dillanian citation.

Giant aloe. FREEMAN and CHANDLER, World's Commercial Products, p. 326, fig., 1907.

Acaulescent, not cespitose though exceptionally suckering. Leaves dull dark green, glaucous when young, broadly lanceolate, rather abruptly acute, concave, almost cochleate and plicate toward the end, 25–30 by 150–200 cm.; spine black-brown, smooth, polished near the tip, rather unguiculately conical awl-shaped, 3–5 mm. long with dull-brown conical or laterally compressed involute basal thickening, making the whole about 7 by 10–15 mm., decurrent and dorsally intruded into the green tissue; prickles usually 10–12 mm. apart, 2–3 mm. long, straight or recurved, narrowly or acuminate triangular from somewhat lenticular bases, the at first reddish intervening margin nearly straight. Inflorescence 5–6 m. or more high, the upper third or more narrowly oblong-paniculate with very ascending branches; bracts deltoid, approximated, appressed; pedicels 10 or even 20 mm. long, the longest bibracteate below the middle. Flowers yellow, 65–75 mm. long or more; ovary 45–55 mm. long, considerably exceeding the perianth, oblong-fusiform, somewhat constricted shortly above the base; tube conical, about 15 mm. deep; segments 8–10 by 20–25 mm., about half as long as the ovary; filaments inserted nearly in the throat, 35 mm. long, less than twice as long as the segments. Not known to bear capsules. Freely bulbiferous.

Caribbees. The "Maypole," "coratoe," or "she silk grass" of Barbados; spontaneous on the leeward side, and everywhere planted in hedge-rows from which it escapes.

Specimens examined: BARBADOS (*Wright* in *Herb. Martii*; *Trelease*, 17-19, 1907; *Todd*, *Stockdale*, and *Bovell*, 1907).

Pressed flowers of "*Aloe americana muricata*," marked as *No. 5*, but without other indication of their source, occur in the herbarium of the South Kensington branch of the British Museum (pl. 65). Though with a more narrowly conical tube and longer anthers than the fresh flowers that I have seen possess, they probably represent this species, which was so designated by Hughes.

Agave unguiculata n. sp.

Plates B and 39.

Agave sp. HART, Rept. Trinidad Gard., 1890 (see *Gard. Mag.*, vol. 35, p. 160, 1892), as to St. Lucia.

General dimensions and aspect of *A. Karatto*. Leaves green, broadly lanceolate, 28 by 200 cm., concave; spine dark chestnut, stoutly conical, awl-shaped, unguiculately recurved, 5-6 by 10-15 mm., flat on the upper face becoming involute at base, shortly decurrent, deeply intruded into the green tissue dorsally; prickles reddish chestnut, usually 5-10 mm. apart, 1-2 mm. long, nearly straight, triangular-acuminate, the intervening margin often a little concave. Inflorescence paniced; pedicels as much as 20 mm. long. Flowers golden yellow, 75-80 mm. long; ovary 45-50 mm. long, considerably exceeding the perianth, oblong-fusiform, somewhat constricted shortly above the base; tube conical, about 12 mm. deep; segments 6 by 20-25 mm., about half as long as the ovary; filaments inserted rather below the throat, 40-45 mm. long, twice as long as the segments. Fruit and bulbils unknown.

Caribbees. The "langue à boeuf" of St. Lucia.

Specimens examined: ST. LUCIA. Casembas (*Moore*, 1, 1910, the type).

Agave ventum-versa n. sp.

Plates B and 40.

A. caribaea? Kew Bull., 1893, p. 280.

General aspect of *A. Karatto*. Leaves green, lanceolate, 10 by 100 cm. and more; spine red-chestnut, becoming gray, smooth, slightly polished, somewhat upcurved, conical, involutely grooved to or beyond the middle, 4-6 by 20-25 mm., decurrent and dorsally intruded into the green tissue; prickles reddish fading to gray, 5-10 mm. apart, 2-3 mm. long, straight or somewhat recurved or even doubly bent, very broadly triangular, the intervening often continuously papery margin nearly straight, sometimes with minute intercalated cusps. Inflorescence paniculate. Flowers yellow, 50 mm. long; ovary 25-30 mm. long, rather longer than the perianth, fusiform; tube conical, about 5 mm. deep; segments 4 by 20 mm., considerably shorter than the ovary; filaments inserted nearly in the throat, scarcely 30 mm. long, one-half longer than the segments. Fruit and bulbils unknown.

Caribbees. St. Vincent; rocky cliffs on the leeward side of the island.

Specimens examined: ST. VINCENT (*H. H. and G. W. Smith*, 1705; *Sands*, 1909, the type).

Differing from the other Caribaeae in its more horny-based spine and nearly deltoid though not very thick prickles.

ANTILLANAE.

Plates 41 to 82.

Mostly large or very large not caespitose acaulescent plants with numerous curved fleshy more or less glossy usually green leaves with long variously grooved often papery-decurrent spine and moderately large usually subdistant prickles; mostly ample more or less open panicles; medium-sized or large yellow or orange rarely congested flowers; rather large usually stipitate capsules, and medium-sized seeds. Sometimes bulbiferous.

Confined to the Greater Antilles and Virgin Islands.

Spine rather stout or short, acute or awl-pointed—Continued.

Leaves green.

Capsules oblong.

Pedicels short (5–10 mm.). Flowers rather small.....*A. Shaferi*.

Pedicels usually long (15–20 or even 40 mm.).

Flowers orange, very large.....*A. Legrelliana*.

Flowers yellow.

Flowers rather large (about 70 mm.).

Filaments more than twice as long as segments.....*A. longipes*.

Filaments scarcely twice as long as segments.

Haitian. Foliage unknown.....*A. intermixta*.

Cuban. Leaves with few and small or no prickles.....*A. anomala*.

Flowers moderate (about 55 mm.).

Capsules elongated. Panicle ample.....*A. Underwoodii*.

Capsules stout. Panicle strict.....*A. missionum*.

Capsules subglobose. Pedicels rather short.....*A. portoricensis*.

Agave antillarum Descourtilz.

Plates 41 to 43.

Agave antillarum DESCOURTILZ, Fl. Pitt. et Méd. des Antilles, vol. 4, p. 239, pl. 284, 1827.—Koch, Wochenschr. Ver. Beförd. Gartenbau, 1860, p. 27; Fl. des Jard., 1861, p. 117; Belgique Hort., 1862, p. 210, the described variegation resting on a misunderstanding of the coloring of Descourtilz's plate.—SALM, Wochenschr. Ver. Beförd. Gartenbau, 1861, pp. 178 and 181; Fl. des Jard., 1862, pp. 117 and 123, with similar misinterpretation.—GRISEBACH, Fl. British West Indian Islands, p. 582, 1864; Cat. Pl. Cubensium, p. 250, 1866.—PARRY, Rept. Santo Domingo (Ex. Doc. 9, 42 Congr., 1 sess., Senate), p. 86, 1871.—ENGELMANN, Trans. Acad. Sci. St. Louis, vol. 3, pp. 297 and 313, 1875; Bot. Works, pp. 303 and 310, 1887.—COLMEIRO, Prim. Notic. Veg. America, p. 35, 1892.—PETERSEN, Bot. Tidsskr., vol. 18, p. 266, pl. 19, 1893.—TRELEASE, Wiesner Festschr., p. 333, 1908.

A. vivipara LAMARCK, Encycl. Méthod., vol. 1, p. 53, 1783; Tabl. Encycl., vol. 2, p. 378, 1793.—SMITH in Rees, Cycl., vol. 1, 1819.—Both as to Santo Domingo.—MOSCOSO, Famil. Vej. Santo Domingo, p. 39, 1891.

A. sobolifera SALM, Hort. Dyck., p. 307, 1834.—v. JACOBI, Hamburg. Gart. u. Bl. Zeit., 1865, p. 218; Versuch., p. 121.—BAKER, Gard. Chron., new ser., vol. 8, p. 780, 1877; Handbook Amaryllid., p. 194, 1888.—TERRACCiano, Primo Contrib. p. 47, 1885.—All as to Santo Domingo only.—HARSHBERGER, Proc. Philadelphia Acad. Nat. Sci., 1901, p. 559.

A. americana SCHOMBURGK, Verhandl. Ver. Beförd. Gartenbau., vol. 11, p. 231, 1835.—RITTER, Naturhist. Reise. . . . Haiti, p. 192, 1836.—COLMEIRO, Prim. Notic. Veg. America, pp. 21 and 35, 1892.—URBAN, Symb. Antillanae, vol. 4, p. 152, 1903, as to Haiti or Santo Domingo only.

A. dominicensis RÜSE, Bot. Tidsskr., vol. 18, p. 266, 1893. Name only.

?*Agave* sp. TAYLOR, Journ. New York Bot. Gard., vol. 11, p. 13, 1910.

Acaulescent, not cespitose. Leaves bright green, lanceolate gradually acute, somewhat concave, about 8 by 100 cm.; spine brown, smooth, dull, nearly straight, conical, involutely grooved near the base, 3 by 15–20 mm., decurrent; prickles 10–25 mm. apart, 2–3 mm. long, straight or upcurved, narrowly triangular from lenticular bases or acuminate deltoid, the intervening margin typically nearly straight. Inflorescence (about 5 m. high?) narrowly oblong-paniculate in the upper half or third, with ascending branches at the ends of which the flowers are densely clustered; pedicels 5–10 mm. long. Flowers deep orange, 40–50 mm. long; ovary 25–30 mm. long, exceeding the perianth, oblong-fusiform; tube open, scarcely 5 mm. deep; segments 4 by 15 mm., about half as long as the ovary; filaments inserted in the throat, 25–30 mm. long, about twice as long as the segments. Capsules narrowly oblong, 15 by 40–45 mm., stipitate and beaked; seeds 4 by 6 mm. Not known to be bulbiferous.

Greater Antilles. Haiti, on southern exposures.

Specimens examined: SANTO DOMINGO (*Parry, Wright, and Brummel*, 1871; *Petersen*). HAITI (*Nash*, 826, 1903, cultivated from near Marmelade at the New York Botanical Garden and in Fairmount Park).

The earliest-named species of its group. Were it not that Engelmann and Petersen have affixed this name with definiteness to the short-flowered *Agave* of the southern part of Haiti, it could hardly find place in current literature. As used by Descourtilz, it was intended to designate the “karatas ou caragn[u]ata-mala” of both Haiti and Cuba, but it is neither described nor figured with sufficient accuracy to show more than that it stood for a *Euagave* with fragrant orange flowers, clustered at the ends of ascending branches in an inflorescence said to reach a

height of 20 feet. Of the species known for the islands named, it can hardly be identified as closely with any other as with that to which the name, following the botanists mentioned, is here applied. As so used it designates what appears to have been the Haitian "maguei" of Oviedo, who also applied that name to some similar Cuban form and to *A. Cocui* of the South American mainland.

Intermixed with the Parry, Wright, and Brummel specimens of *A. antillarum* are slender panicle branches with long thin pedicels congested at their ends and dissociated long deep-tubed flowers and broad capsules, with rather larger and glossier seeds; it is not impossible that the heavier-toothed leaves which form part of their collection in the National Herbarium belong with these. Though this latter point must remain in doubt, the species represented by this material may be provisionally differentiated on its flowers and seeds under the name *A. intermixta*.¹ In the herbarium of the South Kensington Museum an early specimen consisting of a very young plant with two small leaves and a single flower with already greatly swollen ovary (pl. 65) is preserved as from the Chelsea Garden, under the name "*Aloe yuccae foliis*," etc., of Sloane. The flower, which can hardly go elsewhere, differs from those of *Agave longipes* and agrees with those of *A. intermixta* in having filaments scarcely 30 mm. long, and not greatly surpassing the segments.

Agave sobolifera Salm.

Plates B and 44-48.

- Agave sobolifera* SALM, Hort. Dyck., vol. 8, p. 307, 1834.—DON, Sweet's Hort. Britannicus, 3d ed., p. 705, 1839.—STEUDEL, Nomencl. Bot., 2d ed., p. 37, 1841.—ROEMER, Ensatae, p. 292, 1847.—KUNTH, Enum. Pl., vol. 5, p. 822, 1850.—V. JACOBI, Hamburg. Gart. u. Bl. Zeit., 1864, pp. 460, 461, and 501; 1865, p. 218; Versuch, pp. 6, 7, 17, and 121, 1865.—BAKER, Gard. Chron., new ser., vol. 8, p. 780, 1877; Handbook Amaryllid., p. 194, 1888.—RICASOLI, Bull. Soc. Tosc. Ort., vol. 3, p. 307, 1878.—TERRACCIANO, Primo Contrib., p. 47, 1885.—SEGURA, El Maguey, 4th ed., p. 127, 1901.—The last five as to vegetative characters only.—DRUMMOND and PRAIN, Bengal Bull., 1905, No. 8, pp. 49 and 51; Agric. Ledger, 1906, pp. 125 and 127.
- Aloe americana sobolifera*. HERMANN, Hort. Acad. Lugd.-Bat. Cat., p. 16, fig., 1687.—RAY, Hist. Pl., vol. 2, p. 1906, 1688.—BOERHAAVE, Index Alter Pl., vol. 2, p. 129, 1727.—TREW, Commerc. Norimbergae, 1744, p. 367.
- Aloe secunda*. SLOANE, Cat. Pl. Jamaica, p. 118, 1696; Voyage to Madera and Jamaica, vol. 1, p. 246, 1707.
- Agave* sp. BROWNE, Civ. and Nat. Hist. Jamaica, p. 199, 1756.—?HART, Rept. Trinidad Gard., 1890 (see Gard. Mag., vol. 35, p. 160, 1892).
- Agave vivipara* LAMARCK, Encycl. Méthod., vol. 1, p. 53, 1783; Tabl. Encycl., vol. 2, p. 378, 1793; Encycl. Planches, vol. 1, pl. 235, 1823.—BARHAM, Hort. Americanus, p. 49, Index, p. 4, 1794.—TITFORD, Sketches Hort. Bot. Americanus, p. 57, pl. 1, fig. 15, pl. 7, fig. 4, 1812.—POIRET, Encycl. Suppl., vol. 1, p. 240, 1810.—SMITH in Rees, Cycl., vol. 1, 1819.—BAKER, Gard. Chron., new ser., vol. 8, p. 780, 1877, as to fig. 150.—RICASOLI, Bull. Soc. Tos. Ort., vol. 3, p. 306, 1878, as to fig. 36.
- Agave americana* LAMARCK, Encycl. Méthod., vol. 1, p. 52, 1783.—SWARTZ, Obs. Bot., p. 128, 1791.—LUNAN, Hort. Jamaicensis, vol. 1, p. 235, 1814.—GRISEBACH, Fl. Br. West Indian Islands, p. 582, 1864.—URBAN, Symb. Antillanae, vol. 4, p. 152, 1903.—All as to Jamaica.
- Agave Morrisii* KENT, The Blaschka Glass Models, p. 27, 1908.
- ? "*Coratoo*" or "*curaca*," ROBINSON, Columbian Mag. (Kingston), 1798 (see Bull. Bot. Dept. Jamaica, new ser., No. 6, p. 71, 1899).—See also LONG, Hist. Jamaica (see ROYLE, Fibrous Plants, p. 42, 1855).

Acaulescent, not cespitose. Leaves rather light green, somewhat glossy, variously lanceolate, gradually acute or somewhat acuminate, often deeply and plicately or undulately concave, 15-25 by about 125 cm.; spine reddish brown, smooth, somewhat glossy, nearly straight, conical, slightly flattened, grooved or mostly involutely channeled below the middle when mature, 3-4 by 15-25 mm., not decurrent; prickles mostly about 10 mm. apart, 2-4 mm. long, straight or variously curved, rather acuminately triangular, often hardened onto the tops of

¹ *Agave intermixta* n. sp.

Plate 64.

Pedicels slender, 15-25 mm. long, congested at the ends of the panicle branches. Flowers yellow (?) about 65 mm. long; ovary 35 mm. long, elongated fusiform, exceeding the perianth; tube narrowly conical, about 8 mm. deep; segments 4 by 20 mm., more than half as long as the ovary; filaments inserted nearly in the throat, 30 mm. long, one-half longer than the segments. Capsules rather broadly pyriform-oblong, 20 by 40 mm., stipitate and beaked; seeds 5 by 8 mm.

Haiti, Greater Antilles. SANTO DOMINGO (Parry, 1871, in herb. Engelman, the type); v. *Türkheim*, 3073?; ?[*Bonpland*?], 1820, Ex Museo Paris.

green prominences between which the margin is more or less concave. Inflorescence 3-6 m. high, oblong-paniculate above the middle with rather short spreading branches; pedicels stout, 8-10 mm. long. Flowers yellow, about 50 mm. long; ovary 25 mm. long, equaling the perianth, oblong-fusiform; tube open, 5-7 mm. deep; segments bluntly triangular-oblong, about 7 by 20 mm., shorter than the ovary; filaments inserted toward the middle of the tube, about 45 mm. long and twice as long as the segments. Capsules broadly oblong, 20-25 by 35-40 mm., stipitate and beaked; seeds 5 by 7 mm. Freely bulbiferous.

Greater Antilles. The common "coratos" of southern Jamaica.

Specimens examined: JAMAICA. Papine Corner to Gordontown (*Trelease*, 9, 10, 1907). Hope Gardens (*Harris*, 9643, and fruit, 1907). Mouth of Hope River (*Harris*, 1906). Sta. Cruz Mts. (?*Harris*, 1907).

Enough doubt may attach to Salm's application of the name *A. sobolifera* to render its use for a West Indian species unwise. The original of its prototype, Hermann's soboliferous American Aloe, with greenish-yellow flowers, is not said by him to have come from the islands, but his sketchy illustration, hardly picturing any known species, represents one of the Antillanae rather than anything else, and was reproduced by Lamarek in illustration of his own *Agave vivipara* which he ascribed to Jamaica and Santo Domingo, in which he is followed by Salm. If, as is here done, the characteristic golden- or orange-flowered species of the latter island be taken as *A. antillarum*, the dominant light-yellow-flowered plant of the former island remains as *A. sobolifera*. Though the species is not known to have flowered in European gardens except for Hermann's plant at Haarlem, it seems impossible to distinguish between young plants of what has long been grown under this name and Jamaican plants of like age, justifying a conclusion that the garden species which Salm called *sobolifera* is really the same.

Variegated forms of this or the following occur in gardens, of which one is known to have originated in the mountains of Jamaica.¹

Agave Morrisii Baker.

Plate 49.

Agave Morrisii BAKER, Gard. Chron., 3d ser., vol. 1, pp. 543 and 549, fig. 105, 1887; Handbook Amaryllid., p. 184, 1888.—Kew Bull., 1888, p. 91.—?FAWCETT, Kew Bull., 1888, p. 162; Provisional List Jamaica, p. 42, 1893.—HARRIS, Bull. Bot. Dept. Jamaica, No. 14, p. 5, 1889; No. 15, p. 5, 1889; No. 17, p. 10, 1890.—MORRIS, Kew Bull., 1891, p. 133; Add. Ser., vol. 2, p. 276, 1901.—MICHOTTE, Rev. Sci. Nat. Appl., vol. 41, No. 2, p. 262, 1894.—Gartenflora, vol. 36, p. 389, 1887.—NICHOLSON, Dict. Suppl., vol. 1, p. 28, 1892-3; Dict. Prat. Hort., vol. 1, p. 83, 1889.—VOSS and SIEBERT, Vilmorin's Blumengärtnerei, p. 1037.—DODGE, Rept. Fiber Invest. (U. S. Dept. Agric.), No. 9, pp. 5 and 47, 1897.—Kew Hand List Tend. Monocot., p. 117, 1897.—*Trelease*, Wiesner Festschr., p. 336, 1908.—URBAN, Symb. Antillanae, vol. 6, p. 125, 1909.—DRUMMOND, Kew Bull., 1910, pp. 346 and 348.

Agave Morrisii MICHOTTE, Rev. Cult. Colon, vol. 5, p. 310, 1899.

Aspect of *A. sobolifera*. Leaves equally variable in form, rather dull; prickles often longer, sometimes 6-7 mm., and retrorse, narrowly triangular. Inflorescence rather broader. Flowers 55-60 mm. long; ovary 25-30 mm. long, equaling the perianth, fusiform; tube open, about 8 mm. deep; segments involutely attenuate from a broad base, about 8 by 20-25 mm., shorter than the ovary; filaments inserted at about the middle of the tube, 40-50 mm. long and twice as long as the segments. Fruit and bulbils as in *A. sobolifera*.

Greater Antilles. Southern Jamaica.

Specimens examined: JAMAICA. Blue Mountains (*Morris*, capsules). Port Henderson (*Harris*, 10156, 1908). Chestervale (*Harris*, Jan. 27, 1911).

Neither this nor the preceding species is to be expected on the Caymans, from which one is reported.

¹ *Trelease*, Wiesner-Festschrift, 1908, pp. 336, 348, and 356, pl. 11.

Agave Harrisii n. sp.

Plates 50 and 51.

Acaulescent, not cespitose. Leaves rather glossy dark green, narrowly lanceolate, gradually acute, nearly flat, 15 by 100–125 cm.; spine reddish brown, smooth, glossy, somewhat flexuous or recurved, conical, narrowly channeled toward the base, 2 by 10–15 mm., not decurrent; prickles 10–20 mm. apart, scarcely 2 mm. long, straight or curved, narrowly triangular, often from the tops of mammaeform green prominences, the intervening margin straight or concave. Inflorescence paniculate; pedicels 5–10 mm. long. Flowers yellow, 45–50 mm. long; ovary 25 mm. long, rather exceeding the perianth, fusiform; tube open, 7–8 mm. deep; segments erect, 4 by 12–15 mm., much shorter than the ovary; filaments inserted near the bottom of the tube, 30–35 mm. long, about twice as long as the segments. Capsules narrowly oblong, 15–20 by 45–50 mm., turbinate narrowed rather than stipitate, shortly beaked; seeds 4–5 by 7 mm. Bulbils unknown.

Greater Antilles. Interior of Jamaica.

Specimens examined: JAMAICA. Troy (*Britton*, 595, 1906; *Harris*, 1907, 1909, 1911, the types).

The Cockpit Country, where this species occurs, is described by Mr. William Harris, to whom it is dedicated, as an elevated ruggedly broken plateau about 2,000 feet above sea level, of honey-combed limestone which weathers into a rich red soil, with a temperate climate and subject to heavy rainfall (120 inches per year) that is quickly carried away in underground streams. Except when cleared for cultivation the land is heavily wooded, and thus in striking contrast with the dry coastal limestone hills occupied by *A. sobolifera*. (See, further, Harshberger, *Phytogeogr. Surv. North America*, p. 678, 1911.)

Agave acicularis n. sp.

Plate 52.

Leaves slightly grayish, dull, lanceolate, about 12 by 100 cm.; spine gray-brown, smooth, slightly glossy, straight, stoutly acicular, subtriangularly grooved below the middle, 4 by 25 mm., decurrent; prickles chestnut, 10–15 mm. apart, 2–3 mm. long, gently upcurved, below the middle becoming more distant (25 mm.), larger (4 mm.), and reflexed occasionally with out-curved point, triangular, somewhat lenticular based, the intervening margin slightly concave. Scape-bracts narrowly triangular with sharp brown margin; pedicels scarcely 5 mm. long. Flowers yellow, 40–45 mm. long; ovary 25 mm. long, exceeding the perianth, fusiform; tube open, about 5 mm. deep; segments 4 by 12–15 mm., about half as long as the ovary; filaments inserted slightly below the throat, 25 mm. long, about twice as long as the segments. Capsules apparently to become subpyriform and little stipitate or beaked; seeds unknown. Bulbils unknown.

Greater Antilles. Central Cuba.

Specimens examined: CUBA. Rio San Juan. (*Britton*, *Earle*, and *Wilson*, 5926, 1910, the type.)

Agave grisea n. sp.

Plates 54 to 56.

Agave sp. *Britton*, *Journ. New York Bot. Gard.*, vol. 11, 1910, p. 110.

Acaulescent, not cespitose. Leaves green, transiently glaucous, or gray, rather dull, lanceolate, little concave, 10–20 or 25 by 150–200 cm.; spine reddish chestnut or brown, smooth, nearly dull, slightly curved, triquetrously conical or somewhat awl-tapered, flattened or shallowly concave to or beyond the middle or becoming subinvolute, 4–5 by 10–15 or 20 mm., decurrent for its length or more; prickles 15–25 (or exceptionally 45) mm. apart, 2–3 (or even 5) mm. long, gently curved, heavily triangular, sometimes wider or sublenticular at base, the intervening margin from nearly straight to decidedly concave. Inflorescence 6–8 m. high,

oblong-paniculate above the middle; pedicels 5–10 mm. long. Flowers golden, 40–55 mm. long; ovary 20–30 mm. long, exceeding the perianth, oblong-fusiform; tube about 8 mm. deep; segments 4 by 15–18 mm., about half as long as the ovary; filaments inserted nearly in the throat, 35–40 mm. long, about twice as long as the segments. Capsules oblong, 20 by 40 mm., shortly stipitate and beaked; seeds 5 by 6–7 mm. Not known to be bulbiferous.

Greater Antilles. South-central Cuba.

Specimens examined: CUBA. Cienfuegos, on islands in the lower bay (*Grey*, 1, 1908, the type; *Britton, Earle, and Wilson*, 4596, 1910; *Britton, Cowell, and Earle*, 10294, 1911).

Polymorphic. The typical form, with dull yellowish gray-green lanceolate nearly straight-edged leaves armed with broadly triangular rather lenticular-based prickles as much as 4 mm. long and a stout flattened rather than grooved spine 4–5 mm. in diameter, and with yellow flowers 40–45 mm. long with filaments 30 mm. long, varies into a glossy green form with oblanceolate repand somewhat undulate leaves bearing prickles about 2 mm. long acuminate and inequilaterally narrowed from rounded bases and a slender shallowly grooved spine 3 mm. in diameter and with more golden flowers 45–50 mm. long with filaments 40 mm. long (var. *cienfuegosana*,—*Grey*, 1908; *Britton, Earle, and Wilson*, 4590, 1910, pl. 55), and an aberrant of this with the prickles as large as in the type but acuminate tapered from the hardened tops of inequilateral green prominences and a tumidly thickened shallow-grooved spine (var. *obesispina*,—*Grey*, 1908).

Agave Shaferi n. sp.

Plate 57.

Leaves green, elongated lanceolate, rather gradually pointed, about 10 by 75 cm.; spine brown, smooth, dull, unguicately recurved, conical-awl-shaped, openly V-grooved to the middle, 3 by 10 mm., not decurrent; prickles similarly colored, 10–20 mm. apart, about 1 mm. long, slightly curved in either direction, triangular from lenticular bases, the intervening margin slightly concave. Inflorescence paniculate, 6–7 m. high. Flowers bright yellow, 50 mm. long; ovary 25–30 mm. long, exceeding the perianth, fusiform; tube conical, 5–6 mm. deep; segments 4 by 14 mm., about half as long as the ovary; filaments inserted nearly in the throat, scarcely 25 mm. long and but one-fourth longer than the segments. Fruit unknown. Bulbils unknown.

Greater Antilles. Eastern Cuba.

Specimens examined: CUBA. Loma Menqura (*Shafer*, 3800, 1910, the type).

Agave Legrelliana von Jacobi.

Plates 58 to 62.

Agave Legrelliana VON JACOBI, Hamburg. Gart. u. Bl. Zeit., 1865, p. 567; 1866, p. 266; Versuch, pp. 198 and 253, 1864.—

BAKER, Gard. Chron., new ser., vol. 8, p. 620, 1877; Handbook Amaryllid., p. 188, 1888.—HEMSLEY, Biol. Centrali-Americana, vol. 3, p. 344, 1882–6.—BRITTON, Journ. New York Bot. Gard., vol. 12, p. 89, 1911.

A. americana LA SAGRA, Hist. Fis. Cuba, vol. 11, p. 261, 1850.—GRISEBACH, Cat. Pl. Cubensium, p. 250, 1866.—URBAN, Symb. Antillanae, vol. 4, p. 152, 1903, as to Cuba.

A. coccinea LACHAUME, Rev. Hort., 1876, p. 182.

?*A. Offoyana* v. JACOBI, Hamburg. Gart. u. Bl. Zeit., 1864, p. 501; 1865, pp. 62 and 214; Versuch, pp. 17, 72, and 116, 1864.—KOCH, Wochenschr. Ver. Beförd. Gartenbau, 1865, p. 112.—DE SMET, Pr. Cour., No. 5, p. 16, 1869; No. 7, p. 30, 1874; No. 10, p. 35, 1877.—ELMEET, Belgique Hort., 1871, p. 118.—BAKER, Gard. Chron., new ser., vol. 8, p. 620, 1877; Handbook Amaryllid., p. 187, 1888.—RICASOLI, Bull. Soc. Tosc. Ort., vol. 3, p. 278, 1878.—PEACOCK, List, p. 3, 1878.—SEGURA, El Maguey, 4th ed., p. 109, 1901.

Acaulescent, not caespitose. Leaves dark green, variously lanceolate, sub-acuminate, concave, sometimes plicate, 20–30 by 100–200 cm.; spine brown, smooth, dull, a little curved, conical-awl-shaped, openly or flatly grooved below the middle or involute, 4–5 by 15–20 mm., scarcely decurrent; prickles 10–15 or 20 mm. apart, 2–6 mm. long, usually downcurved below, narrowly triangular, acuminate tapered, or from abrupt green prominences the tops of which harden lunately, the intervening margin often concave. Inflorescence 6–8 m. high, amply ovoid-paniculate throughout, with ascending-recurved branches; pedicels 20–30 mm. long.

Flowers deep orange, 70–80 mm. long; ovary 40–45 mm. long, exceeding the perianth, oblong, somewhat contracted above the base and at top; tube about 15 mm. deep; segments 7 by 30 mm., three-fourths as long as the ovary; filaments inserted nearly in the throat, 60 mm. long and twice as long as the segments. Capsules rather narrowly oblong, 15–20 by 40–50 mm., stipitate and slightly beaked; seeds 4 by 7 mm. Not known to be bulbiferous.

Greater Antilles. Northern Cuba.

Specimens examined: CUBA. Matanzas, the source of the type (*Britton and Wilson*, 77, 1903). Cojimar, near Guanabacoa (*Trelease*, 1, 1907; *Britton, Earle, and Wilson*, 6217, 1910; *Wilson*, 9543, 1910). Cayo Romano (*Shafer*, 2770, 1909).

A form of this species, with typical foliage but flowers only 55 mm. long, ovary shorter than the perianth, and filaments but 35 mm. long, which occurs on the hills near Chorrera, Havana (*Britton, Cowell, and Leon*, 9578, 1911) may be known as var. *breviflora*.

Though long disposed to place *A. Offoyana* among the Antillares in association with *A. Willdingii*, I have become convinced that if really a Cuban species, as was supposed when it was described, it should be allied with that native to Matanzas, which must be taken for *A. Legrelliana*, although mature plants differ much in prickly characters from those described for the type. On the other hand, the characters of this common species of the northern coast are so much less in accord with those published for *A. Offoyana* as to prevent the use of this as clearly the earlier name for the plant.

Agave longipes n. sp.

Plate 63.

Foliage of the broader-leaved forms of *A. sobolifera*, but the often gray sometimes much compressed conical spine more heavy and persistently flattened on the upper face and less involute, and the narrowly triangular prickles often appressed-recurved. Pedicels 20 mm. long. Flowers yellow, larger, 60–70 mm. long; ovary 30–40 mm. long, exceeding the perianth, oblong-fusiform; tube openly conical, 6–8 mm. deep; segments 5–6 by 20–25 mm., shorter than the ovary; filaments 50–60 mm. long, more than twice as long as the segments. Fruit and bulbils unknown.

Greater Antilles. Blue Mountains of Jamaica.

Specimens examined: JAMAICA. Content Road near Chestervale (*Maxon*, 1624, the type). Chestervale (*Harris*, 1909, 1910, 1911).

This part of the Blue Mountains is said by Mr. Harris to be from 3,000 to 3,500 feet above sea level, subject to heavy rainfall (over 100 inches per year), and with a moist warm atmosphere. The rocks are conglomerate or of intrusive igneous origin in the main, without lime, and the soil is shaly or a stiff clay.

Agave anomala n. sp.

Plate 66.

Leaves green, elongated lanceolate, rather gradually pointed, 10 by 75–100 cm.; spine reddish brown, smooth, rather dull, unguiculately recurved, conical-awl-shaped, openly grooved to about the middle, 3 by 10 mm., shortly decurrent and dorsally intruded into the green tissue; margin not repand, unarmed or with few and very small prickles toward the base. Inflorescence paniculate; pedicels slender and about 10 mm. long or much stouter and becoming 40 mm. long. Flowers yellow, 55–60 or even 70 mm. long; ovary 30–40 mm. long, rather exceeding the perianth, oblong-fusiform; tube conical, 8–10 mm. deep; segments 4–5 by 20 mm., about half as long as the ovary; filaments inserted nearly in the throat, about 40 mm. long and twice as long as the segments. Capsules (abnormal) narrowly pyriform-oblong, 15 by 40 mm., somewhat stipitate and beaked; seeds 4 by 6 mm. Not known to be bulbiferous.

Greater Antilles. Eastern Cuba.

Specimens examined: CUBA. Holguin to Myabe (*Shafer*, 1409, 1909, the type).

The only indigenous Antillean species known ever to lack marginal prickles. The inflorescence fragments with more scattered and longer pedicels appear to be from a sucker, and, like the fruit that they bear, aberrant.

Agave Underwoodii n. sp.

Plates B and 67 to 71.

A. Morrisii WORSLEY, Distrib. Amaryll., p. 6, 1895.*A. americana* MILLSAUGH, Publ. Field Mus. Bot., vol. 2, p. 31, 1900.*Agave* sp. BRITTON, Journ. New York Bot. Gard., vol. 10, p. 104, 1909.

Acaulescent, not cespitose. Leaves green, more or less narrowly lanceolate, gradually or in the broader forms acuminate pointed, concave, 20–25 by 100–200 cm.; spine brown, smooth or a little roughened, rather dull, straight or slightly upcurved, triquetrously conical or somewhat awl-shaped, openly grooved to or beyond the middle or involute, 4–6 by 15–25 mm., decurrent and somewhat dorsally intruded into the green tissue; prickles brown or chestnut, about 10 (or even 20–30) mm. apart, 2–5 mm. long, straight or somewhat curved or occasionally hooked, mostly downward, rather heavily triangular from lenticular bases, exceptionally on green prominences, the intervening margin straight or somewhat concave. Inflorescence 4–8 mm. high, the upper three-fourths or more broadly paniculate with acutely recurved branches; pedicels slender, 15–20 mm. long. Flowers golden, 50–55 mm. long; ovary 25–35 mm. long, rather exceeding the perianth, oblong-fusiform; tube conical, plicated, about 8 mm. deep; segments 5 by 15 or 20 mm., typically about half as long as the ovary; filaments inserted somewhat below the throat, 30–50 mm. long, two or three times as long as the segments. Capsules narrowly oblong, about 15 by 40–45 mm., stipitate and beaked; seeds 3–4 by 5–6 mm. Not known to be bulbiferous.

Greater Antilles. Southeastern Cuba.

Specimens examined: CUBA. Santiago (Pollard, Palmer, and Palmer, 266, 1902; Underwood, 1699, 1903; Trelease, 2 and 3, 1907, the type; Britton, 1857, 1909). Guantanamo (Britton, 2151, 1909). Novaliches (Maxon, 4516, 1907, with capsules 20 mm. thick; Britton, 1981, 1909, with short ovary but representative fruit). Holguin (Shafer, 1225, 1909).

Considerable variation occurs about Santiago in the color of spine and prickles, which are sometimes almost black, in the openness of the spine-groove, and in the length of the perianth segments and the exertion of the filaments. The Guantanamo flowers differ from one another as well as from those of Santiago. Though far out of the usual range, and in the region of the preceding, the Holguin number is apparently referable to this species.

Agave missionum n. sp.

Plates B and 72 to 75.

A. vivipara OLDENDORF, Gesch. Mission. Caraiben Inseln, p. 221, 1777.*Agave* sp. SCHLECHTENDAL, Linnaea, vol. 3, p. 254, 1828.—BØRGESSEN, Bot. Tidsskr., vol. 29, p. 257, fig. 40, 1909.—TRELEASE, Pop. Sci. Mo., vol. 78, p. 7, fig. 4, 1911.*A. americana* SCHOMBURGK, Verhandl. Ver. Beförd. Gartenbau., vol. 11, pp. 226, 229, and 130[=230], 1835.—EGGERS, Vidensk. Meddel. Naturhist. Foren., 1876, pp. 77, 79, and 155; Bull. U. S. Nat. Mus. No. 13, pp. 7 and 109, 1879.—URBAN, Symb. Antillanae, vol. 4, p. 152, 1903, as to St. Jan and St. Thomas.*A. Morrisii* EGGERS, Vidensk. Meddel. Naturhist. Foren., 1889, p. 20.—MORRIS, Kew Bull., 1891, p. 133; Add. Ser., vol. 2, p. 275, 1901.—HARSHBERGER, Phytogeogr. Surv. North America, p. 686, 1911.? *A. Karatto* Agric. News, vol. 5, p. 61, 1906, as to Virgin Islands.

Acaulescent, not cespitose. Leaves dark green or very slightly grayish, at length rather glossy, broadly lanceolate, gradually acute, concave, occasionally plicate, 20 by 250–275 cm., or, according to Schomburgk, 50 by 300–450 cm.; spine brown, or gray in age, smooth, somewhat glossy, straight or a little upcurved, somewhat triquetrously awl-shaped, round-grooved to about the middle or occasionally involute, 36 by 15–25 mm., decurrent and dorsally produced into the green tissue; prickles from brown to nearly black, mostly 10–15 mm. apart, 3–5 mm. long, straight, gently curved, or bent in either direction, heavily triangular, the smaller from often confluent lenticular bases, the intervening margin nearly straight. Inflorescence 5–7 m. high, the upper two-thirds oblong-paniculate with subascending branches; bracts deltoid, appressed, not imbricated; pedicels mostly 15 or 20 mm. long. Flowers yellow, 55 mm. long; ovary 30 mm. long, exceeding the perianth, oblong-fusiform; tube about 7 mm. deep;

segments 5 by 15–20 mm., rather more than half as long as the ovary; filaments inserted nearly in the throat, 35 mm. long, about twice as long as the segments. Capsules broadly oblong or somewhat turbinate, 20–25 by 30–40 mm., stipitate and beaked; seeds 5–6 by 6–8 mm. Exceptionally bulbiferous.

Greater Antilles. The “karatá” of St. Thomas and the Virgin Islands.

Specimens examined: ST. THOMAS. Krumbay, abundant in the chaparral (*Trelease*, 16, 1907; *Emanuel*, 1908, 1909). Ma Folie, occasional and less evidently spontaneous (*Trelease*, 15, 1907, the type). Elsewhere about Charlotte Amalia (*Trelease*, 14, 1907; *Emanuel*, 1907, 1908; *Eggers*, 305). TORTOLA (*Fishlock*, 1908). ST. JAN (*Hornbeck*).

Seedlings from the Tortola plant are much darker green and glossier than the young plants collected on St. Thomas.

Agave portoricensis n. sp.

Plates B and 76 to 82.

Agave americana STAHL, An. Soc. Españ. Hist. Nat., vol. 4, p. 22, 1875.—BELLO, An. Soc. Españ. Hist. Nat., vol. 12, p. 120, 1883.—URBAN, Symb. Antillanae, vol. 4, p. 152, 1903.

Agave sp. LEDRU, Reise, vol. 2, p. 183, 1812.—COOK and COLLINS, Contrib. U. S. Nat. Herb., vol. 8, p. 68, 1903.

Acaulescent, not cespitose. Leaves dark green, glossy, more or less lightly glaucous when young, broadly lanceolate, subacuminate, somewhat plicately concave, 15–20 by 100–150 cm.; spine chocolate or chestnut, smooth, glossy, somewhat curved, sometimes compressed from the sides and basally thickened, conical-awl-shaped, shallow-grooved, or involute nearly to the end, 2–5 or even 7 by 10–15 or 20 mm., decurrent for several times its length and dorsally intruded into the green tissue; prickles mostly 15–30 mm. apart, 2–5 mm. long, straight or retrorsely turned, heavily triangular from lenticular bases, the intervening margin more or less concave. Inflorescence 5–6 m. high, narrowly oblong-paniculate in the upper half or more, with nearly horizontal branches; bracts deltoid, appressed, not imbricated; pedicels about 10 mm. long. Flowers greenish-yellow, about 55 mm. long; ovary 30–35 mm. long, considerably exceeding the perianth, oblong-fusiform; tube conical, about 7 mm. deep; segments 5 by 15 mm., half as long as the ovary; filaments 40 mm. long, more than twice as long as the segments.¹ Capsules subglobose, 20–25 by 25–30 mm., stipitate, more or less beaked; seeds 6 by 7–9 mm. Bulbiferous, at least in western Puerto Rico.

Greater Antilles. The “cocuiza” or “maguey” of southern Puerto Rico and of Culebra.

Specimens examined: PUERTO RICO. Peñon (*Goll*, 626, 1899). Vicinity of Coamo Springs (*Underwood and Griggs*, 587, 1901; *Dewey*, 1907). Various points along the military road between Coamo and Aibonito, especially near the marks of kilometers 86.7, 89.2, 91.6, and 99 from San Juan (*Britton and Cowell*, 1379, 1906; *Trelease*, 7, 1907, the type). Hills near Sabana Grande (*Curt*, 1903; *Trelease*, 4, 1907). Cultivated in Sabana Grande (*Trelease*, 5, 1907) and at the Mayaguez Experiment Station (*Henricksen*, 1906; *Trelease*, 1907). CULEBRA (*Britton and Wheeler*, 236, 1906, with the leaf-margin notched between some of the closer nearly deltoid prickles, and the stout spine openly grooved to the middle).

The perhaps differentiable plants of the western part of the island (pls. 79 to 82) have less recurving and less plicate more glaucous leaves with more triquetrous open-grooved spines and more often curved prickles, more ascending (young) panicle-branches, longer-pedicelled rather less rugose capsules, and, apparently, they more constantly produce bulbils in the old inflorescence.

BAHAMANAE.

Plates 83 to 92.

Rather large not cespitose acaulescent plants with numerous somewhat curved fleshy mostly dull and gray leaves with long grooved usually papery-decurrent spine and small or moderate usually subdistant prickles; rather ample ovoid panicles with subhorizontal branches; medium-sized bright yellow flowers scarcely congested; rather large stipitate capsules, and medium-sized seeds. Occasionally bulbiferous.

Confined to the Bahamas.

¹ The floral proportions are derived from enlargements of an inflorescence photograph taken at Coamo Springs by Mr. Dewey (pl. 77).

Leaves elongate-lanceolate.

Capsules broadly oblong.

Leaves somewhat glossy, greenish; spine elongated.....*A. Millspaughii*.

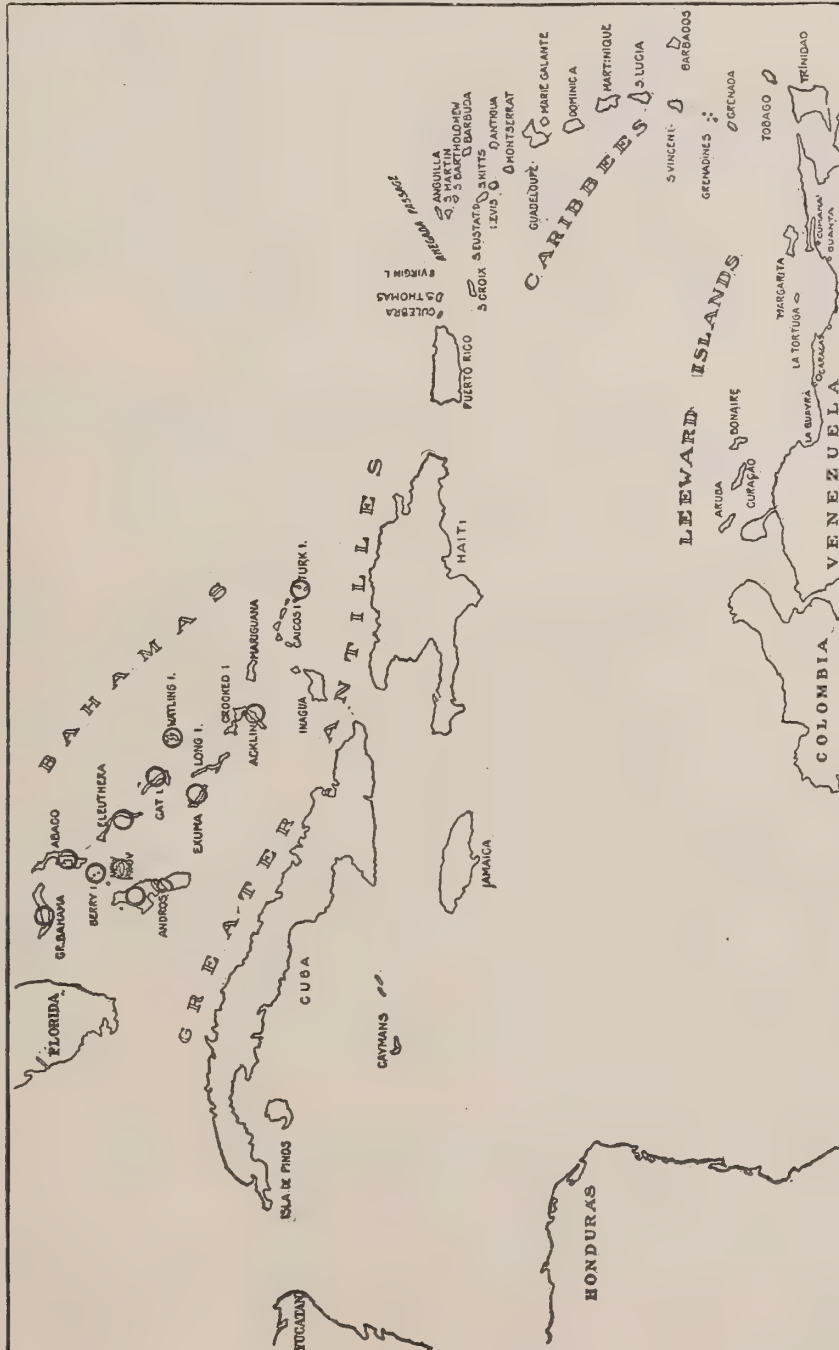


FIGURE 4.—Map showing distribution of the Bahamaneae.

Prickles rather close (5-10 mm.), minute (about 1 mm.).

Spine rather slender; prickles not lenticular. Pedicels 15-20 mm. Capsules narrowly oblong.... *A. indagatorium*.

Agave Braceana n. sp.

Plate 83.

Agave sp. EATON and SETCHELL, Johns Hopkins Univ. Circular, No. 6, p. 46, 1886.? *A. mexicana* DOLLEY, GARDINER, and BRACE, Proc. Philadelphia Acad. Nat. Sci., 1889, p. 356, as to upper Bahamas.? *A. lurida* Kew Bull., 1889, pp. 61 and 254.

Acaulescent, not cespitose. Leaves gray, broadly oblanceolate, nearly flat, 19 by 65 cm. (or larger?); spine from brownish becoming gray, smooth, dull, straight or gently curved, conical, flat or round-grooved to about the middle or becoming involute, 3 by 10–15 mm., slightly decurrent; prickles usually 5–10 mm. apart, 2–3 mm. long, straight or the lower gently recurved, triangular, scarcely lenticular at base, the intervening margin straight, or concave when they are raised on low green bases. Inflorescence about 7 m. high, paniculate; pedicels about 10 mm. long. Flowers golden-yellow, 40–45 mm. long; ovary 20 mm. long, nearly half as long again as the perianth, oblong-fusiform; tube conical, about 7 mm. deep; segments 3–4 by 15–17 mm., three-fourths as long as the ovary; filaments inserted nearly in the throat, 35 mm. long, about twice as long as the segments. Capsules broadly oblong, 20 by 35 mm., shortly stipitate and beaked; seeds 6 by 8 mm. Bulbils unknown.

Bahamas. The "manilla plant" or "bamboo" of the northern islands on Little Bahama Bank.

Specimens examined: ABACO. Opposite the Cherokee settlement (*Brace* 1982, 1904, the type). GREAT BAHAMA. Eight Mile Rocks (*Britton and Millspaugh*, 2467, 1905). West End (*Brace*, 3510, 1905). Mastic Point (*Brace*, 7110, 1907).

Agave bahamana n. sp.

Plates 84 to 86.

? *A. americana* DOLLEY, GARDINER, and BRACE, Proc. Philadelphia Acad. Nat. Sci., 1889, p. 356, in part.*A. sobolifera* HITCHCOCK, Rept. Missouri Bot. Gard., vol. 4, pp. 136 and 169, 1893, as to Eleuthera and Cat Island.*A. rigida* NORTHROP, Mem. Torrey Bot. Club, vol. 12, pp. 28, 78, and 94, 1902; Naturalist in Bahamas, pp. 10, 11, 68, 145, and 195, 1910.—COKER, Vegetation of the Bahama Islands (From Shattuck, The Bahama Islands), p. 251, pl. 40, 1905.*Agave* sp. BRITTON, Journ. New York Bot. Gard., vol. 6, p. 82, figs. 19 and 20, 1905; vol. 8, pp. 73 and 78, 1907; Discovery, vol. 1, pp. 30 and 31, 2 figs., 1907.—Florists' Exch., 1906, p. 500.—TRELEASE, Pop. Sci. Mo., vol. 70, pp. 207–209, fig. 1, 1907.

Acaulescent, not cespitose. Leaves dull grayish, rather narrowly lanceolate, concave, occasionally somewhat plicate, 15 by 200–300 cm.; spine from brownish becoming gray, smooth, dull, slightly recurved, stoutly conical, usually becoming involutely grooved below the middle, 4–5 by 10–15 mm., decurrent; prickles usually 5–10 mm. apart, 3–5 mm. long, reduced above and below, straight or the longer ones appressed-recurved, triangular, scarcely lenticular at base, sometimes on small green prominences, the intervening margin nearly straight. Inflorescence about 10 m. high, the upper third or so ovoid-paniculate with slightly ascending branches; bracts deltoid, not imbricated; pedicels about 10 mm. long. Flowers golden, 50–60 mm. long; ovary 30–35 mm. long, half as long again as the perianth, oblong-fusiform; tube conical, about 7 mm. deep; segments 4 by 15 mm., about half as long as the ovary; filaments inserted nearly in the throat, 30–35 mm. long, more than twice as long as the segments. Capsules oblong, 25 by 50 mm., shortly stipitate and beaked; seeds 6 by 8 mm.

Bahamas. The "bamboo" of the north-central islands.

Specimens examined: GREAT HARBOR CAY, Berry Islands (*Britton and Millspaugh*, 2340, 1905, the type). CAVE CAY, Exuma Chain, where the next would be expected (*Britton and Millspaugh*, 2829). CAT ISLAND. The Bight and vicinity (*Britton and Millspaugh*, 5931, 1907). ELEUTHERA. Governor's Harbor (*Hitchcock*, 1890). Glass Window to Harbor Island (*Britton and Millspaugh*, 5381, 1907). ANDROS. Red Bays (*Northrop*, 501). Deep Creek (*Brace*, 5127, 1906). Possibly also on EXUMA, judging from a small living plant supposed to represent *Britton and Millspaugh*, 3038; and on NEW PROVIDENCE, judging from a small living plant supposed to represent *Britton*, 867.

Agave Millspaughii n. sp.

Plates 87 and 88.

Acaulescent, not cespitose. Leaves somewhat glossy, green, narrowly oblanceolate, concave, 15 by 125 cm. or more; spine red-brown, smooth, rather dull, straight, conical, triquetrous or V-grooved below the middle, 3-4 by 15-20 mm., decurrent for its length or more; prickles usually 15-25 mm. apart, 3-5 mm. long, straight and spreading or occasionally reflexed sometimes with upcurved tips, narrowly triangular, scarcely lenticular at base, the intervening margin nearly straight. Inflorescence large, paniculate; bracts broadly triangular; pedicels about 10 mm. long. Flowers (yellow?) 50 mm. long; ovary 25 mm. long, little longer than the perianth, fusiform; tube conical, about 7 mm. deep; segments 4 by 15-20 mm., three-fourths as long as the ovary; filaments inserted nearly in the throat, scarcely 30 mm. long, about one-half longer than the segments. Capsules short-oblong, 20 by 35 mm., shortly stipitate and beaked; seeds 5 by 7 mm.

Bahamas. The "bamboo" of the south central islands.

Specimens examined: GREAT EXUMA (*Britton and Millspaugh*, 3091, the type, and 3038; both in 1905).

Agave cacozeila n. sp.

Plates B and 89 to 91.

?*A. rigida* HARSHBERGER, *Phytogeogr. Surv. North America*, p. 689, 1911.

Acaulescent, not cespitose. Leaves yellowish green, somewhat overcast with gray, typically roughish, lanceolate, deeply concave, 20 by 150-200 cm.; spine from brownish becoming gray, smooth, dull, straight or the tip slightly refracted, triquetrously conical, openly grooved below the middle, 3-5 by 15-20 mm., decurrent; prickles usually 10-15 mm. apart, 2-5 mm. long in the middle, nearly straight or the larger ones appressed-recurved, narrowly triangular, rarely lenticular at base, the intervening margin straight or somewhat concave. Inflorescence 6-7 m. high, the upper third densely ovoid-paniculate with horizontal or slightly ascending branches; bracts broadly triangular, not imbricated; pedicels about 10 mm. long. Flowers golden, 50-60 mm. long; ovary 35-40 mm. long, about half as long again as the perianth, oblong-fusiform; tube rather open, about 7 mm. deep; segments 4-5 by 20 mm., about half as long as the ovary; filaments inserted nearly in the throat, 40-45 mm. long, rather more than twice as long as the segments. Capsules narrowly oblong, 15 by 35-45 mm., shortly conical-stipitate, beaked; seeds 4 by 6-7 mm. Said to be bulbiferous sometimes.

Bahamas. The "bamboo" of New Providence.

Specimens examined: NEW PROVIDENCE (*Cunningham*, 1907, the type; *Britton*, 867, 1904; *Britton and Brace*, 523, 1904; *Brace*, 1909, 1910).

Seedlings raised from the typical Cunningham material are decidedly papillate-roughened on both leaf surfaces.

Agave acklinicola n. sp.

Plate 91.

Aspect of *A. bahamana*. Spine from red-brown becoming gray, smooth, glossy, somewhat flexuously recurved, conical, involutely grooved to or beyond the middle, 4-6 by 20-25 mm., decurrent; prickles 5-10 mm. apart, 1-1.5 mm. long, straight or gently curved, rather acuminate deltoid often from oblique green prominences, or with lenticular bases, the intervening margin nearly straight. Inflorescence, flowers, fruit, and bulbils unknown.

Bahamas. Acklin Island; perhaps to be expected on Fortune and Crooked islands and possibly also on Mariguana.

Specimens examined: ACKLIN ISLAND (*Brace*, 4442, 1906, and in Feb., 1910, the types).

Perhaps a similar *Agave* said to be from the Turk Islands, cultivated at Kew under the number 273/00 and at La Mortola (*Berger*, 53), of which I have seen only immature material with slenderer spine and unrepaud margin, is also to be referred here, but Dr. Millspaugh has failed to find such a plant in either the Turk or Caicos group.

Agave indagatorium n. sp.

Plate 92.

Agave sp. BRITTON, Journ. New York Bot. Gard., vol. 8, p. 78, 1907; vol. 11, p. 197, 1910; Discovery, vol. 1, pp. 30 and 32, 1907.

Acaulescent, not cespitose. Leaves somewhat grayish and at first very glaucous beneath, lanceolate, somewhat concave, gradually acute, 20–25 by 150–250 cm.; spine chestnut, smooth, rather glossy, nearly straight, conical, involutely grooved to the middle, 3 by 12 mm., decurrent for about its own length; prickles 5–12 mm. apart, about 1 mm. long, straight or slightly recurved, narrowly triangular, not lenticular at base, the somewhat membranous at first slightly pink intervening margin straight. Inflorescence 9 m. high, paniculate; pedicels 15–20 mm. long. Flowers unknown. Capsules narrowly oblong, 20 by 55–60 mm., thick-stipitate, acuminate pointed; seeds 5 by 7–8 mm. Said by Dr. Britton to be bulbiferous.

Bahamas. Watling Island; possibly also to be sought on Rum Cay and Conception Island.

Specimens examined: WATLING ISLAND. Little Lake (*Britton and Millspaugh, 6155, 1907*, the type).

Named in commemoration of the explorers who are reputed to have sighted this island first in the New World; and of Dr. Britton and his associates, without whose collections the present study would have been impossible.

ANTILLARES.

Plates 93 to 100.

Medium-sized, not cespitose, acaulescent plants with moderately numerous spreading curved fleshy smooth mostly green leaves with narrowly grooved or involute rarely papery-decurrent spine and small sub-distant prickles; small lax panicles with rather small yellow or orange flowers congested at the ends of their branches; small thin-walled capsules, and moderately small seeds. Not known to be bulbiferous. Confined to the Western Antilles.

Tube of perianth short.

Flowers orange *A. Willdingii*.

Flowers yellow.

Leaves nearly white *A. albescens*.

Leaves grayish. Capsules roundish *A. papyrocarpa*.

Leaves green. Capsules oblong *A. Brittoniana*.

Tube of perianth deeply conical *A. tubulata*.

Agave Willdingii Todaro.

Plates 93 and 94.

Agave Willdingii TODARO, Hort. Bot. Panorm., vol. 2, p. 36, pl. 32; Bot. Centralbl., vol. 46, p. 191, 1891.—TERRACIANO, Boll. Ort. Bot. Palermo, vol. 1, p. 26, 1897; vol. 2, p. 135, 1898.—Index Sem. Panorm., 1899, p. 5.

A. Willdingii BAKER, Handbook Amaryllid., p. 187, 1888.—Delectus Sem. Panorm., 1894, p. 4.—Kew Hand List Tend. Monocot., p. 123, 1897.—ROSE in Bailey, Cyclop. American Hort., vol. 1, p. 36, 1900.—BERGER, Gartenwelt, vol. 2, p. 604, 1898; Monatsschr. Kakteenkunde, vol. 11, p. 36, 1901; Gard. Chron., 3d ser., vol. 47, p. 423, 1910.—MUELLER, Bot. Zeit., vol. 67, No. 1, p. 130, 1909.

A. Willdingii SEGURA, El Maguey, 4th ed., p. 108, 1901.

A. Willdingii MUELLER, Bot. Zeit., vol. 67, No. 1, p. 137, 1909.

Acaulescent, not cespitose. Leaves rather few, light green or slightly glaucous, broadly oblong-lanceolate, gradually acute, slightly concave and plicate, 15 by 60–80 cm.; spine brown, smooth, dull, conical, slit-grooved below the middle, 2–3 by 10–15 mm., scarcely decurrent; prickles at length 10–15 mm. apart, 1–3 mm. long, variously curved, acuminate triangular or somewhat lenticular at base and on green prominences, the intervening margin slightly concave. Inflorescence 4–5 m. high, the upper third or more very loosely paniculate, with few outcurved slender branches; pedicels slender, about 5 mm. long. Flowers orange, 30 mm. long, ovary

Greater Antilles. Western Cuba.?



FIGURE 5.—Map showing distribution of the Antillares.

Not definitely known as a wild plant. The type was cultivated at Palermo, without record of origin, and the species is still grown there, at La Mortola, etc., the material now used for description having been sent from the latter place by Mr. Berger.

Agave albescens n. sp.

Plates 53 and 116.

Agave sp. BRITTON, Journ. New York Bot. Gard., vol. 10, p. 108, fig., 1909, in part.

Acaulescent, not caespitose. Leaves light gray, dull, slightly rough, transiently glaucous and banded, oblong-lanceolate, flattish, plicate, 15 by about 45 cm.; spine blackish chestnut, dull or even roughened except at the tip, somewhat recurved, conical, shallowly grooved or involute below the middle, 4 by 15 mm., very shortly decurrent; prickles about 10 mm. apart, 2-3 mm. long, usually straight or gently curved, broadly triangular or acuminate deltoid, the intervening margin nearly straight. Inflorescence paniculate, 5 m. high; pedicels slender, 10 mm. long. Flowers 30-35 mm. long, golden; ovary 15 mm. long, shorter than the perianth, fusiform; tube open, 5-6 mm. deep; segments 4 by 12-14 mm., rather shorter than the ovary; filaments inserted somewhat below the throat, 35 mm. long, nearly thrice as long as the segments.

Greater Antilles. Southeastern Cuba.

Specimens examined: CUBA. Guantanamo Bay (Britton, 2085, 1909, the type; Eggers 4563, flowers).

Apparently a small species, variable in its leaf characters; differing from the few other gray-leaved Cuban agaves in the granular roughening of its leaves and the final purplish black color of spine and prickles. The flowers, for which I am indebted to Professor Urban, can scarcely belong to anything else.

Agave papyrocarpa n. sp.

Plates 95 to 97.

Furcraea sp. HARSHBERGER, Phytogeogr. Surv. North America, p. 676, 1911.

Acaulescent, not caespitose. Leaves at first lightly glaucous and rather dull, oblong to elongated oblanceolate, gradually acute, somewhat concave, sometimes a little plicate above, 15 by 75-125 cm.; spine brown, smooth or slightly granular below, somewhat polished toward the end, usually a little curved and somewhat conical-awl-shaped, narrowly grooved below the middle, 3 by 8-15 mm., not decurrent; prickles 10-25 mm. apart, 1-4 mm. long, straight or variously and unequally curved mostly downward, triangular from scarcely or little dilated bases, the intervening margin nearly straight or concave on young plants, occasionally with one or several minute intercalated prickles. Inflorescence 4 m. high, the upper half or more very loosely paniculate, with few slender outcurved branches; pedicels slender, about 10 mm. long. Flowers light yellow, about 40 mm. long; ovary 20 mm. long, equaling the perianth, fusiform; tube conical, 4 mm. deep; segments 4 by 15 mm., somewhat shorter than the ovary; filaments inserted nearly in the throat, 25 mm. long and one-half longer than the segments. Capsules globose-oblong, 15-20 by 20-25 mm., not stipitate and little beaked, brown, thin-walled; seeds 4-5 by 5-6 mm.

Greater Antilles. Isla de Pinos.

Specimens examined: ISLA DE PINOS. About Nueva Gerona (Curtiss, 335, Feb., 1904, the type; Trelease, 20, Mar. 1907).

Agave Brittoniana n. sp.

Plates B, 98, and 99.

Agave sp. BRITTON, Journ. New York Bot. Gard., vol. 11, p. 111, 1910.

Leaves grayish green, very slightly and transiently glaucous, slightly glossy, broadly lanceolate, acute or rather abruptly pointed, 20 by 100 cm.; spine brown, dotted with white, smooth, somewhat polished, unguiculate curved, subconical or involute much thickened below, openly grooved to the middle or involute, 2-3 by 10-15 mm., more or less decurrent; prickles 10-20 or occasionally 25 mm. apart, 2-4 mm. long, variously curved, slender-cusped from lenticular or from heavy bases which in the lower third of the leaf may stand on retrorse green

prominences, the intervening margin often concave. Inflorescence paniculate, as much as 9 m. high; pedicels slender, about 10 mm. long. Flowers yellow, 30–35 mm. long; ovary 15–20 or 25 mm. long, about equaling the perianth, fusiform; tube open, 3–4 mm. deep; segments 3 by 12–15 mm., shorter than the ovary; filaments inserted nearly in the throat, 25 mm. long and nearly twice as long as the segments. Capsules oblong or rather pyriform, 15 by 25–35 mm., strongly stipitate though but slightly beaked; seeds 3–4 by 5–6 mm.

Greater Antilles. Central Cuba.

Specimens examined: CUBA. Hanabanilla Falls, Trinidad Mountains (*Britton, Earle, and Wilson, 4776, 1910, the type; Britton and Cowell, 10182, 1911*). Arroyo Grande, Trinidad Mountains (*Britton and Wilson, 5444, 1910*). La Vigia Hill, Trinidad (*Britton and Wilson, 5533, 1910*). Santa Clara (*Britton, Britton, and Wilson, 6183, 1910, a form, perhaps separable, with shorter pedicels and oblong-pyriform capsules, which may be known as var. brachypus*). Bahia Honda (? *Wright, in Herb. Grisebach as "A. sobolifera"*).

Agave tubulata n. sp.

Plates 99 and 100.

Agave sp. BRITTON, Journ. New York Bot. Gard., vol. 11, p. 234, 1910.

A. Wildringii BRITTON, Journ. New York Bot. Gard., vol. 12, p. 92, 1911.

Leaves at length rather glossy green, broadly lanceolate, sometimes plicate, gradually acute or subacuminate, 15–20 by 60–75 or even 90 cm.; spine brown, smooth, dull, aciculary conical, somewhat upcurved or flexuous, round-grooved or involute below the middle, 2 by 15 mm., decurrent; prickles 15–20 mm. apart, 1–3 mm. long, prevailingly upcurved above and recurved below, slender-cusped, lunate rather than lenticular at base, on green prominences or the intervening margin repand. Inflorescence 2–5 m. high; pedicels about 10 mm. long. Flowers yellow, 30–35 mm. long; ovary 15 mm. long, scarcely equaling the perianth; tube narrowly funnelform, 6–8 mm. deep; segments 12 mm. long; filaments inserted nearly in the throat, about 25 mm. long, fully twice as long as the segments. Capsules broadly oblong, 12–15 by 20–35 mm., shortly but distinctly stipitate and beaked; seeds 3–4 by 5–6 mm.

Greater Antilles. Western Cuba, in the Province of Pinar del Rio.

Specimens examined: CUBA. Guane (*Britton, Britton, and Cowell, 9746, 1911, the type*). Baños San Vicente (*Britton, Britton, and Gager, 7388, 1910*). Buenaventura to San Juan de Guacamalla (*Wilson, 9333, 1910*). Sierra de Anafe (*Britton, Cowell, and Leon, 9595, 1911*).

INAGUENSES.

Plates 101 to 105.

Small caespitose acaulescent plants with rather few erect firm and rigid dull smooth gray or very glaucous leaves with long narrowly grooved somewhat papery-decurrent spine and small close-set prickles; rather small lax panicles; rather small yellow flowers congested at the ends of the branches; small scarcely stipitate capsules, and small seeds. Not known to be bulbiferous.

Confined to the southern Bahamas.

Leaves gradually tapering, deeply concave; spine rather slender; prickles deltoid or heavy-based.....*A. Nashii*.
Leaves rather quickly acute, nearly flat; spine short and stout; prickles narrow.....*A. inaguensis*.

Agave Nashii n. sp.

Plates 101 to 103.

Agave sp. NASH, Journ. New York Bot. Gard., vol. 6, pp. 11 and 12, fig. 4, 1905.

Acaulescent, caespitose. Leaves gray-green, sometimes purple-tinged, gray-green, somewhat glaucous and transversely banded, attenuate-oblong, concave, 4–5 by 30–50 cm.; spine purplish brown, smooth, somewhat polished and recurved or upcurved toward the end, conical tapered, narrowly slit-grooved to beyond the middle, 3 by 15 mm., decurrent; prickles usually 3–5 mm. apart, scarcely 2 mm. long, straight or somewhat curved, acuminate triangular, sometimes

nearly or quite confluent, the intervening margin nearly straight. Inflorescence 3.5–4 m. high, the upper third or more very loosely paniculate with slender outcurved branches; pedicels 5–10 mm. long. Flowers light yellow, 35 mm. long; ovary 20 mm. long, exceeding the perianth, subfusiform or obovoid in development; tube openly conical, 3 mm. deep; segments 3 by 10 mm., half as long as the ovary; filaments inserted nearly in the throat, 25 mm. long, more than twice



FIGURE 6.—Map showing distribution of the *Inaguenses*.

as long as the segments. Capsules oblong or oblong-pyriform, 20 by 35 mm., or less, slightly stipitate and beaked; seeds 4 by 4–5 mm.

Bahamas. Inagua, on dry southern exposures.

Specimens examined: INAGUA. Sandy Point (*Nash and Taylor*, 517, 1389, 21855, Nov., 1904, the type).

Agave inaguensis n. sp.

Plates 103 to 105.

Agave sp. NASH, Journ. New York Bot. Gard., vol. 6, pp. 7-9, 1905.

Habit of *A. Nashii*. Leaves typically white-glaucous, oblong or oblanceolate, more quickly acute, flatter, sometimes plicate, 6-9 by 40-60 cm.; spine often shorter and stouter; prickles closer, 2-3 mm. apart, more recurved and less uniform, very narrowly triangular, almost continuously joined by a narrow blackish border. Inflorescence and fruit unknown. Pedicels 5-10 mm. long. Flowers yellow, 50 mm. long; ovary 25-30 mm. long, exceeding the perianth, subfusiform; tube open, 5 mm. deep; segments 5 by 15-17 mm., half as long as the ovary; filaments inserted nearly in the throat, 35 mm. long, fully twice as long as the segments.

Bahamas. Little Inagua and Caicos islands, on dry southern exposures.

Specimens examined: LITTLE INAGUA. Moujean Harbor (*Nash and Taylor*, 342, 1215, 21832; 329, 1202, 21833, Nov. 1904, the type). SOUTH CAICOS (*Wilson*, 7684, 1907).

SISALANAE.

Plates 106 to 115.

Medium-sized or large suckering subcaulescent or caulescent plants with rather numerous firm and rigid straight narrow gray or somewhat glaucous dull smooth leaves with openly grooved not decurrent spine and rather small subdistant prickles (rarely all but lacking); ample oblong panicles; medium-sized or large greenish fetid not congested flowers with maroon-dotted filaments and style, abundant inflorescence bulbils; and, when produced, moderately large capsules and large seeds.

Continental plants introduced into a few islands.

Spine tortuous, flat-topped; prickles very slender from deltoid bases..... *A. angustifolia*.
Spine slightly arcuate, grooved toward the base; prickles (if present) gradually tapered.

Caulescent, gray-leaved, armed..... *A. fourcroydes*.

Acaulescent, greener, at most with reduced prickles..... *A. sisalana*.

Agave angustifolia Haworth.

Plates 106 to 109.

Agave angustifolia HAWORTH, Syn. Pl. Succ., p. 72, 1812.—TRELEASE, Rept. Missouri Bot. Gard., vol. 19, p. 273, 1908.

A. rigida var. HART, Rept. Trinidad Gard., 1890 (see Gard. Mag., vol. 35, p. 160).—Kew Bull., 1892, pp. 35 and 101; 1893, p. 280.

?*A. vivipara* Kew Bull., 1892, p. 99.

A. rigida elongata Bull. Bot. Gard. Grenada, No. 30, p. 285, 1893.

A. Wightii DRUMMOND, Rept. Missouri Bot. Gard., vol. 18, p. 27, 1907.

Subcaulescent or the trunk at length over 1 m. high, cespitose. Leaves light gray-green, narrowly lanceolate, flatly concave, 8 by 40-65 cm.; spine red-brown becoming gray, slightly granular, rather dull, acicularly conical, often flexuous, the upper surface obliquely flattened, 4 by 25-40 mm., not decurrent; prickles similarly colored or nearly black, usually 20-25 mm. apart, 3-5 mm. long, mostly upcurved above and recurved below or doubly flexed, very slender-cusped from deltoid bases, the intervening margin straight. Inflorescence 2-5 m. high, the upper quarter openly ovoid-paniculate with outcurved branches; bracts narrow; pedicels scarcely 5 mm. long. Flowers yellowish green, 40-50 mm. long; ovary 15-20 mm. long, shorter than the perianth, broadly fusiform; tube openly conical, about 10 mm. deep; segments 4 by 15 mm., about equaling the ovary; filaments inserted about the upper third of the tube, 30 mm. long, twice as long as the segments. Capsules subglobose or turbinate, 25-30 by 30-35 mm., stipitate and beaked; seeds 7-8 by 8-10 mm., broad-winged. Freely bulbiferous.

Barbados, common as a hedge-plant and somewhat escaped; also apparently on St. Vincent. Like *Yucca aloifolia*, known as "Spanish needle." Introduced, from an unrecorded source. Long known in European gardens under various names and extensively naturalized in the drier parts of India.

Specimens examined: BARBADOS (*Waby*, 107, 1895; *Trelease*, 21-23, 1907).

Agave fourcroydes Lemaire.

Plates 110 to 112.

Agave fourcroydes LEMAIRE, Ill. Hort., vol. 11, Miscell., p. 65, 1864.*A. rigida elongata* Kew Bull., 1892, p. 33.—BRAUN, Pflanze, vol. 4, p. 70, 1908.

Caulescent, the trunk at length 2 m. high, suckering. Leaves dull gray-green, linear-lanceolate, openly concave, 8–10 by 150–250 cm.; spine blackish brown, or gray in age, sometimes pitted



FIGURE 7.—Map showing distribution of the Sisalanae.

and glossy, stoutly conical, slightly recurved, round-grooved below the middle, 4–6 by 20–30 mm., not decurrent; prickles blackish, usually 10–20 mm. apart, 1–4 mm. long, straight or gently curved especially upward, narrowly triangular from at length lenticularly hardened very low elevations of the otherwise nearly straight margin. Inflorescence 6–10 m. high, the upper third

or more rather laxly oblong-paniculate with spreading or recurved branches; pedicels mostly 5–10 mm. long. Flowers yellowish green, 60–65 mm. long; ovary 25–35 mm. long, shorter than the perianth, oblong; tube quickly urceolate, 15–20 mm. deep; segments 6–8 by 15–20 mm., much shorter than the ovary; filaments inserted about the middle of the tube, 40–60 mm. long, twice or thrice as long as the segments. Capsules obovoid-oblong, 25 by 45 mm., slightly stipitate and beaked; seeds 6–8 by 8–10 mm., broad-winged. Freely bulbiferous.

Cuba, escaping from fiber and hedge plantations locally. The “sacqui” or “henequen” of Yucatan, first introduced into the island about 1840.

Specimens examined: CUBA. Cienfuegos (*Grey*, 1908). Playa de Marianao (*Britton and Wilson*, 4545, 1910). Bay of Mariel (*Britton and Earle*, 7588, 1910). Chorrera (*Britton, Cowell, and Leon*, 9580, 1911).

Agave sisalana Perrine.

Plates B and 113 to 115.

Agave sisalana PERRINE, House Document No. 564, pp. 8, 9, 16, 47, 60, 86, and 87; Senate Document No. 300, pp. 36, 105, and 140, pls. 1 and 2 (2d session, 25th Congress, U. S. A.), 1838.

A. rigida sisalana Kew Bull., 1889, p. 254; 1892, pp. 27–35.—Bull. Bot. Dept. Jamaica, No. 21, p. 6, 1891.—Bull. Trinidad Gard., No. 27, p. 329, 1901.—NORTHROP, Mem. Torrey Bot. Club, vol. 12, pp. 28 and 78, 1902; Naturalist in Bahamas, pp. 145, 195, and 212, figs., 1910.—Journ. Jamaica Agric. Soc., vol. 11, p. 271, 1907.—Agric. News, 1908, p. 79.—BRAUN, Pflanze, vol. 4, pp. 69–72, 1908.

Subcaulescent. Leaves finally green and somewhat glossy, at first lightly glaucous and transversely banded on the back, linear-lanceolate, nearly flat, about 10 by 150 cm.; spine dark brown, somewhat pitted and glossy, tumidly conical or triquetrous, slightly recurved, shallowly round-grooved near the base, 4–5 by 20–25 mm., not decurrent; prickles exceptionally nearly as in the last, but typically minute or almost entirely suppressed. Inflorescence about 6 m. high, the upper half loosely oblong-paniculate; pedicels 5–10 mm. long. Flowers yellowish green, 45–60 mm. long; ovary 20–25 mm. long, shorter than the perianth, soon broadly fusiform; tube urceolate, 15–20 mm. deep; segments 6–8 by 15–20 mm., a little shorter than the ovary; filaments inserted about the upper third of the tube, 40–70 or even 80 mm. long, twice or thrice as long as the segments. Capsules, when produced, which is rare, oblong, 20–25 by 60 mm., stipitate and beaked; seeds 7 by 10 mm. Freely bulbiferous.

Escaping from fiber and hedge plantations in various parts of the archipelago. The “yaxci” or “sisal,” originally from Yucatan, but chiefly introduced into the West Indies from southern Florida, where it has become naturalized from plants imported by Perrine.

Specimens examined: ANDROS (*Brace*, 7039, 1907). NEW PROVIDENCE. Lake Killarney (*Eggers*, 4348, 4400). Near Tea House (*Mrs. Britton*, 3415, 1905, in fruit). Ryswick (*Northrop*, 164). CAT ISLAND (*Britton and Millspaugh*, 5912, 5936, 1907). AMBERGRIS CAY, Caicos Islands (*Millspaugh and Millspaugh*, 9305, 1911). ST. CROIX. Work and Rest Estate (*Trelease*, 27, 1907, established from an abandoned trial field). BARBADOS (*Trelease*, 28, 1907, introduced by Mr. Bovell, by way of Jamaica).

The more prickly form (pl. 111), represented by *Harris* No. X, *Britton and Millspaugh* No. 5936, etc., may be known for convenience as var. *armata*

OCCURRENCE OF SPECIES BY ISLANDS.

- Abaco:
Agave Braceana.
Acklin:
A. acklinicola.
Ambergris Cay:
A. sisalana (escaped).
Andros:
A. Braceana.
A. sisalana (escaped).
Anguilla:
A. Scheuermaniana.
Antigua:
A. obducta.
Antilles, Greater:
ANTILLANAE.
ANTILLARES.
Antilles, Lesser:
CARIBAEAE.
Aruba:
A. Trankeera.
A. vicina.
Bahamas:
BAHAMANAE.
INAGUENSES.
Bahama, Great:
A. Braceana.
Barbados:
A. angustifolia (introduced).
A. barbadensis.
A. sisalana (introduced).
Barbuda:
? *A. obducta*.
Berry Islands:
A. bahamana.
Bocas Islands:
? *A. evadens*.
Bonaire:
A. Boldinghiana, var.
A. Trankeera.
Caicos Islands:
A. inaguensis.
A. sisalana (escaped).
Caribbees:
CARIBAEAE.
Cat Island:
A. bahamana.
A. sisalana (escaped).
Cave Cay:
A. bahamana.
Caymans:
?? *A. sobolifera*.
Conception Island:
? *A. indagatorium*.
Crooked Island:
? *A. acklinicola*.
Cuba:
Eastern—
A. acicularis.
A. albescens.
A. anomala.
A. Brittoniana.
Cuba—Continued.
Eastern—Continued.
A. Brittoniana brachypus.
A. grisea.
A. grisea cienfuegosana.
A. grisea obesispina.
A. Underwoodii.
Western—
A. Legrelliana.
A. Legrelliana breviflora.
A. tubulata.
? *A. Willdingii*.
Various—
A. fourcroydes (escaping).
Isla de Pinos—
A. papyrocarpa.
Culebra:
A. portoricensis.
Curaçao:
A. Boldinghiana.
A. petiolata.
A. Trankeera.
A. vivipara.
Dominica:
A. medioxima.
Eleuthera:
A. bahamana.
Exuma Chain:
A. bahamana.
Exuma, Great:
A. Millspaughii.
Fortune Island:
? *A. acklinicola*.
Great Bahama:
A. bahamana.
Great Exuma:
A. Millspaughii.
Great Harbor Cay:
A. bahamana.
Great Inagua:
A. Nashii.
Greater Antilles:
ANTILLANAE.
ANTILLARES.
Grenada:
A. grenadina.
Guadeloupe:
A. Dussiana.
Haiti:
Haiti—
A. antillarum.
Santo Domingo—
A. antillarum.
A. intermixta.
Inagua, Great:
A. Nashii.
Inagua, Little:
A. inaguensis.
Isla de Pinos:
A. papyrocarpa.

OCCURRENCE OF SPECIES BY ISLANDS—Continued.

Jamaica:	St. Barthélemy:
<i>A. Harrisii</i> .	? <i>A. Dussiana</i> .
<i>A. longipes</i> .	St. Bartholomew:
<i>A. Morrisii</i> .	? <i>A. Scheuermaniana</i> .
<i>A. sobolifera</i> .	St. Croix:
Leeward Islands:	<i>A. Eggersiana</i> .
VIVIPARAE.	<i>A. sisalana</i> (escaped).
Les Saintes:	St. Eustatius:
? <i>A. Dussiana</i> .	<i>A. Van Grolae</i> .
Lesser Antilles:	St. François:
CARIBAEAE.	? <i>A. Dussiana</i> .
Little Bahama Bank:	St. Kitts:
<i>A. Braceana</i> .	<i>A. Karatto</i> .
Little Inagua:	St. Lucia:
<i>A. inaguensis</i> .	<i>A. unguiculata</i> .
Lucayas:	St. Martin:
BAHAMANAE.	<i>A. Scheuermaniana</i> .
Mariguana:	St. Thomas:
? <i>A. acklinicola</i> .	<i>A. missionum</i> .
Margarita:	St. Vincent:
? <i>A. evadens</i> .	? <i>A. angustifolia</i> .
Marie Galante:	<i>A. ventum-versa</i> .
? <i>A. Dussiana</i> .	South Caicos:
Martinique:	<i>A. inaguensis</i> .
<i>A. caribaeicola</i> .	Tobago:
Montserrat:	? <i>A. evadens</i> .
<i>A. montserratensis</i> .	Tortola:
Nevis:	<i>A. missionum</i> .
<i>A. nevidis</i> .	Trinidad:
New Providence:	<i>A. evadens</i> .
<i>A. cacozele</i> .	Turk Islands:
<i>A. sisalana</i> (escaping).	? <i>A. acklinicola</i> .
Puerto Rico:	Venezuela:
<i>A. portoricensis</i> .	VIVIPARAE— <i>A. Cocui</i> .
Rum Cay:	Virgin Islands:
? <i>A. indagatorum</i> .	ANTILLANAE— <i>A. missionum</i> .
Saintes, Les:	Watling Island:
? <i>A. Dussiana</i> .	<i>A. indagatorum</i> .
Santo Domingo:	Windward Islands:
<i>A. antillarum</i> .	<i>A. ventum-versa</i> .
<i>A. intermixta</i> .	

COLLECTORS AND COLLECTIONS.

Anstead, R. D.:	Bonpland,—
C29, 1908. <i>Agave grenadina</i> .	1820. <i>Agave intermixta</i> ?
Archer, A. S.:	Bovell, J. R., <i>see</i> Todd.
1908. <i>Agave obducta</i> .	Brace, L. J. K. (<i>see also</i> Britton and Brace):
Berger, Alwin:	1982, 3510, 5127, 7110. <i>Agave Braceana</i> .
53. ? <i>Agave acklinicola</i> .	4442. <i>A. acklinicola</i> .
1905, 1908, 1910. <i>A. Willdingii</i> .	7039. <i>A. sisalana</i> .
Boldingh, I.:	1909-10. <i>A. cacozele</i> .
A2. <i>Agave Boldinghiana</i> .	Britton, Mrs. E. G. (<i>see also</i> N. L. Britton and):
A3. <i>A. vivipara</i> .	3415. <i>Agave sisalana</i> .
A8. <i>A. petiolata</i> .	Britton, N. L.:
A15. <i>A. Trankeera</i> .	344. <i>Agave Karatto</i> .
b. <i>A. Trankeera</i> .	595. <i>A. Harrisii</i> .
K1. <i>A. Trankeera</i> .	867. <i>A. cacozele</i> .
1,2. <i>A. Trankeera</i> .	1857. <i>A. Underwoodii</i> .
3,5. <i>A. vicina</i> .	1981. ? <i>A. Underwoodii</i> .
1019. <i>A. Van Grolae</i> .	2085. <i>A. albescens</i> .
5624. <i>A. petiolata</i> .	— and Brace, L. J. K.:
7456. <i>A. Boldinghiana</i> , var.	523. <i>Agave cacozele</i> .
7457. <i>A. Trankeera</i> .	—, Britton, E. G., and Cowell, J. F.:
1910. <i>A. Cocui</i> .	9746. <i>Agave tubulata</i> .

COLLECTORS AND COLLECTIONS—Continued.

- Britton, N. L., Britton, E. G., and Gager, C. S.:
 7388. *Agave tubulata*.
 ———, ———, and Wilson, P.:
 6183. *Agave Brittoniana brachypus*.
 ——— and Cowell, J. F.:
 1379. *Agave portoricensis*.
 10182. *A. Brittoniana*.
 ———, ———, and Earle, F. S.:
 10294. *Agave grisea*.
 ———, ———, and Brother Leon:
 9595. *Agave tubulata*.
 9578. *A. Legrelliana breviflora*.
 9580. *A. fourcroydes*.
 ——— and Earle, F. S.:
 7588. *Agave fourcroydes*.
 ———, ———, and Wilson, P.:
 4590. *Agave grisea cienfuegosana*.
 4596. *A. grisea*.
 4776. *A. Brittoniana*.
 5926. *A. acicularis*.
 6217. *A. Legrelliana*.
 ——— and Millspaugh, C. F.:
 2340, 2829, 5381, 5931. *Agave bahamana*.
 2467. *A. Braceana*.
 3038, 3091. *A. Millspaughii*.
 5912. *A. sisalana*.
 5936. *A. sisalana armata*.
 6155. *A. indagatorum*.
 ——— and Wheeler, W. M.:
 236. *Agave portoricensis*.
 ——— and Wilson, P.:
 77. *Agave Legrelliana*.
 4545. *A. fourcroydes*.
 5444, 5533. *A. Brittoniana*.
 Brummel, —, *see* Parry, Wright, and Brummel.
 Cowell, J. F., *see* Britton and Cowell.
 Cruiger, —:
 1333. *Agave evadens*.
 Cunningham, W. M.:
 1907. *Agave caczela*.
 Curtiss, A. H.:
 335. *Agave papyrocarpa*.
 Dewey, L. H.:
 1907. *Agave portoricensis*.
 Duss, Père:
 2136. *Agave caribaeicola* (but through crossing of labels apparently in part *A. Dussiana*).
 3961. *A. Dussiana*.
 Earle, F. S., *see* Britton, Cowell, and Earle.
 Ecker, E. E.:
 1909–1910. *Agave Boldinghiana*.
 A. petiolata.
 A. Trankeera.
 A. vivipara.
 Eggers, H. F. A.:
 162. *Agave Eggersiana*.
 305. *A. missionum*.
 4348, 4400. *A. sisalana*.
 4563. *A. albescens*.
 Emanuel, Charles:
 1907–1909. *Agave Eggersiana*.
 A. missionum.
 Fishlock, W. C.:
 1908. *Agave missionum*.
 Gager, C. S., *see* Britton, Britton, and Gager.
 Goll, —:
 626. *Agave portoricensis*.
 Gollmer, —:
 1853. *Agave Cocui*.
 Grey, R. M.:
 1908. *Agave fourcroydes*.
 A. grisea.
 A. grisea cienfuegosana.
 A. grisea obesispina.
 Griggs, R. F., *see* Underwood and Griggs.
 Hahn, M.:
 114. *Agave caribaeicola*.
 Harris, W.:
 1907–1911. *Agave Harrisii*.
 A. longipes.
 A. sobolifera.
 A. sisalana armata.
 10156. *A. Morrisii*.
 9643. *A. sobolifera*.
 Henricksen, H. C.:
 1906. *Agave portoricensis*.
 Hitchcock, A. S.:
 1890. *Agave bahamana*.
 Hornbeck, H. B.:
Agave missionum.
 Jackson, T.:
 1908. *Agave obducta*.
 Johnston, J. R., *see* Miller and Johnson.
 Jones, J.:
 1910. *Agave medioxima*.
 Kew Gardens:
 273/00. ? *Agave acklinicola*.
 Leon, Brother, *see* Britton, Cowell, and Leon.
 Maloney, J. O.:
 1910. *Agave nevidis*.
 Maxon, W. R.:
 1624. *Agave longipes*.
 4516. *A. Underwoodii*.
 Miller, O. O., and Johnston, J. R.:
 243. ? *Agave evadens*.
 Millspaugh, C. F., *see* Britton and Millspaugh.
 Millspaugh, C. F., and Millspaugh, C. M.:
 9305. *A. sisalana*.
 Moore, J. C.:
 1. *Agave unguiculata*.
 Morris, Sir Daniel:
Agave Morrisii.
 Nash, G. V.:
 826. *Agave antillarum*.
 ——— and Taylor, N.:
 517, 1389, 21855. *Agave Nashii*.
 329, 1202, 21833. *A. inaguensis*.
 342, 1215, 21832. *A. inaguensis*.
 Northrop, J. I.:
 164. *Agave sisalana*.
 501. *A. Braceana*.
 Owen, A. E.:
 1910. *Agave Scheuermaniana*.

COLLECTORS AND COLLECTIONS—Continued.

- Palmer, E., and Palmer, W., *see* Pollard and Palmer.
 Parry, C. C., Wright, C., and Brummel, —:
 1871. *Agave antillarum*.
 A. intermixta.
 Petersen, —:
 Agave antillarum.
 Piña-Maya Sisal Company:
 1906. *Agave Cocui*.
 Pollard, C. L., Palmer, E., and Palmer, W.:
 266. *Agave Underwoodii*.
 Ricksecker, A. E.:
 104, 282. *Agave Eggersiana*.
 Robson, W.:
 1908-1909. *Agave montserratensis*.
 Sandz, C. W.:
 1909. *Agave ventum-versa*.
 Scheuerman, J.:
 1910. *Agave Scheuermaniana*.
 von Schrenk, H.:
 1909. *Agave sobolifera*.
 Shafer, J. A.:
 1225. *Agave Underwoodii*.
 1409, 3800. *A. anomala*.
 2770. *A. Legrelliana*.
 Shepherd, F. R.:
 1908, 1910. *Agave Karatto*.
 Smith, H. H., and Smith, G. W.:
 1705. *Agave ventum-versa*.
 Stockdale, F. A., *see* Todd, Stockdale, and Bovell.
 Taylor, N., *see* Nash and Taylor.
 Todd, C., Stockdale, F. A., and Bovell, J. R.:
 1907. *Agave barbadensis*.
 Trelease, W.:
 1. *Agave Legrelliana*.
 2, 3. *A. Underwoodii*.
 4, 5, 7. *A. portoricensis*.
 9, 10. *A. sobolifera*.
 12, 13. *A. Eggersiana*.
 14, 15, 16. *A. missionum*.
 17, 18, 19. *A. barbadensis*.
 20. *A. papyrocarpa*.
 21, 22, 23. *A. angustifolia*.
 27, 28. *A. sisalana*.
 von Türckheim, —:
 3073. *Agave intermixta*?.
 Underwood, L. M.:
 1699. *Agave Underwoodii*.
 ——— and Griggs, R. F.:
 587. *Agave portoricensis*.
 Ustariz, J. P.:
 1909. *Agave Cocui*.
 Van Grol, Mrs. G.:
 1909-1910. *Agave Van Grolae*.
 Waby, J. F.:
 107. *Agave angustifolia*.
 Wheeler, W. M., *see* Britton and Wheeler.
 Wilson, P. (*see also* Britton and Wilson):
 7634. *Agave inaguensis*.
 9333. *A. tubulata*.
 9543. *A. Legrelliana*.
 Wright, —:
 Agave barbadensis.
 Wright, C., (*see also* Parry, Wright, and Brummel).
 Zuloaga, R.:
 1910. *Agave Cocui*.

COMMON NAMES.

- Bamboo (Bahamas):
 Agave bahamana.
 A. Braceana.
 A. cacozela.
 A. Millspaughii.
 Caraguata-mala (Greater Antilles) (*see also* Karatá):
 Agave antillarum.
 Cocui (Venezuela) (*see also* Koeki):
 Agave Cocui.
 Cocuiza (Greater Antilles):
 Agave portoricensis.
 Cocuiza (Venezuela):
 Agave Cocui.
 Furcraea Humboldtiana.
 Coratoe (Greater Antilles) (*see also* Karatá):
 Agave Harrisii.
 A. longipes.
 A. sobolifera.
 Coratoe (Caribbees):
 Agave barbadensis.
 Coratoo (Greater Antilles). = Coratoe.
 Corita (Caribbees) (*see also* Karatá):
 Agave Eggersiana.
 A. Karatto.
 Coryata (Caribbees) (*see also* Karatá):
 Agave Karatto.
 Curaca (Greater Antilles) (*see also* Karatá):
 Agave sobolifera.
 Henequen (Yucatan):
 Agave fourcroydes.
 He silk grass, *see* She silk grass.
 Karatá (Caribbees):
 Agave Eggersiana.
 A. Karatto.
 A. nevidis.
 A. Van Grolae.
 Karatá jaune (Caribbees):
 Agave Dussiana.
 Karatas (Greater Antilles) (*see also* Karatá):
 Agave antillarum.
 Karatto (Caribbees) (*see also* Karatá):
 Agave Karatto.
 Keratto (Caribbees) = Karatto.
 Koeki (Leeward Islands) = Cocui:
 Koekie Indian—
 Agave vivipara.
 Koeki Spanjool—
 Agave Boldinghiana.
 A. vicina.
 Langue à boeuf (Caribbees):
 Agave caribaeicola.
 A. Dussiana.
 A. unguiculata.
 Langue à boeuf (Trinidad):
 Agave evadens.

COMMON NAMES—Continued.

Maguei (Greater Antilles):

Agave antillarum.

A. portoricensis.

Furcraea tuberosa.

Maguei (Venezuela):

Agave Cocui.

Maguei de Cocui=Cocui.

Maguei de Cocuiza=Cocuiza.

Manilla (Bahamas):

Agave Braceana.

Maypole (Caribbees):

Agave barbadensis.

Pita de Trankeera (Leeward Islands):

Agave Trankeera.

Sacqui (Yucatan):

Agave fourcroydes.

Salsepareille (Caribbees):

Agave Dussiana.

She silk grass (Caribbees):

Agave barbadensis (in contrast with the "he" silk grass, Furcraea tuberosa).

Silk grass, see preceding.

Sisal (General):

Agave sisalana.

Spanish needle (Caribbees):

Agave angustifolia.

Trankeera, see Pita de Trankeera.

Yaxci (Yucatan):

Agave sisalana.

INDEX TO SPECIES DESCRIBED AND FIGURED.

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PLATES

PLATE A.

The earliest-known West Indian Agave.

The Aloe americana minor of Munting's Aloidarium, which appears to be *Agave vivipara*, is said by him to have come from New Spain, but is ascribed by Boerhaave to Curaçao.



THE FIRST PICTURE OF A WEST INDIAN AGAVE.

PLATE B.

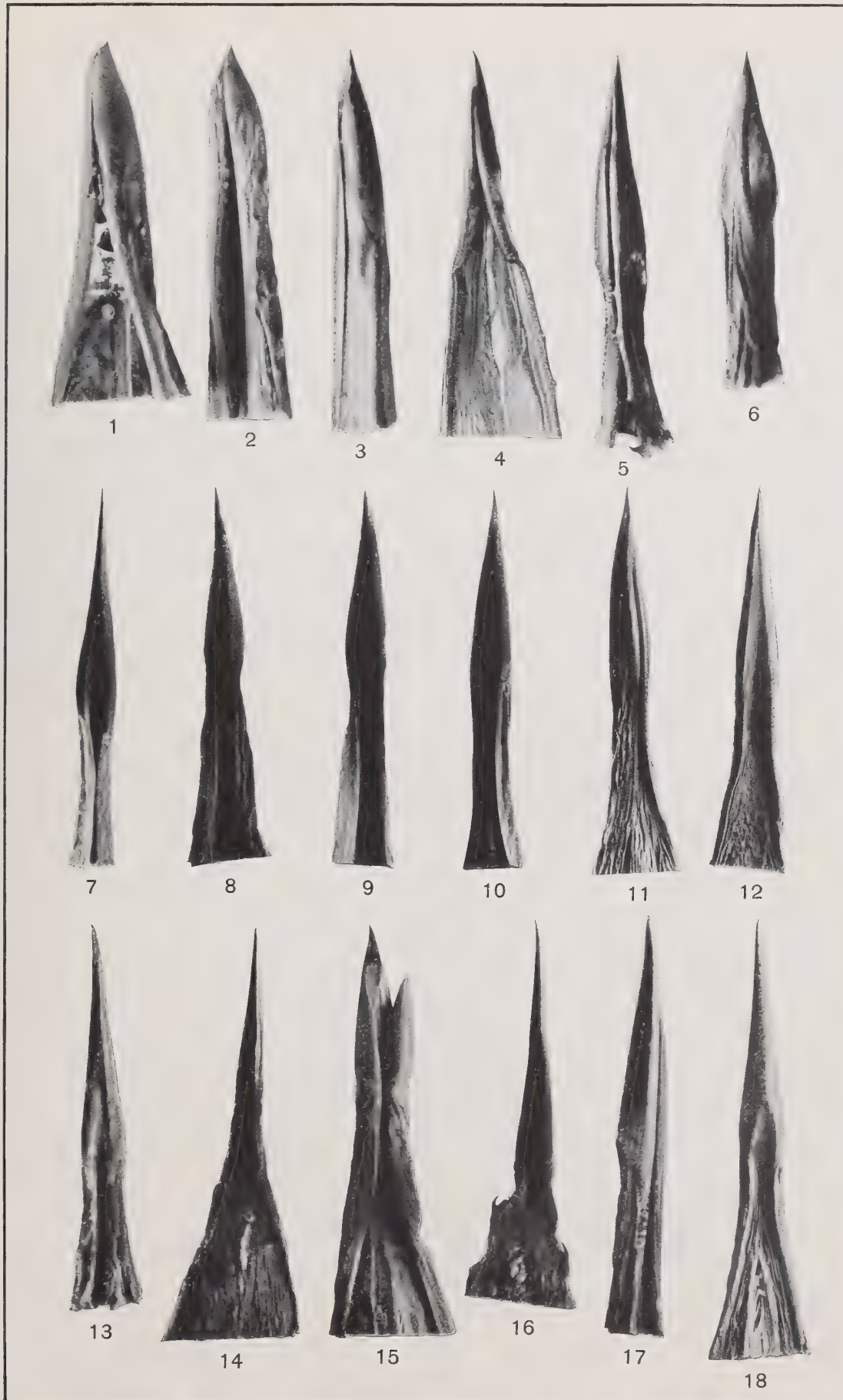
Spine agreements and contrasts.

Top row. CARIBAEAE: 1, 2, *Agave Karatto*, the second spine showing the V-like slit in the spine base more open than usual (St. Kitts, *Shepherd*); 3, *A. montserratensis*, showing the more developed spine-tip (Montserrat, *Robson*); 4, *A. obducta*, showing the still more developed spine proper (Antigua, *Jackson*); 5, *A. ventum-versa*, showing the very strong but still slit-grooved spine (St. Vincent, *Sands*); 6, *A. unguiculata*, showing the stout shallowly grooved spine (St. Lucia, *Moore*).

Middle row. ANTILLANAE: 7, *A. sobolifera*, with more developed and therefore heavier and more grooved base than usual (Jamaica, *Trelease*, 10); 8, *A. Underwoodii*, the typical form with involutely narrowed groove (Cuba, *Trelease*, 3); 9, *A. Underwoodii*, the openly grooved form (Cuba, *Trelease*, 2); 10, *A. missionum* (St. Thomas, *Trelease*, 14); 11, *A. portoricensis*, the involutely grooved spine of the eastern form (Coamo to Aibonito, *Trelease*, 7); 12, *A. portoricensis*, the openly grooved spine of the western form (Sabana Grande, *Trelease*, 4).

Bottom row. BAHAMANAЕ: 13, *A. cacozeia* (New Providence, *Brace*). ANTILLANES: 14, *A. Brittoniana brachypus*, not dissimilar to the spine of *A. vivipara* (Cuba, *Britton*, *Britton*, and *Wilson*, 6183); 15, *A. Brittoniana* with short spine end and enlarged involute base—broken open—recalling that of Caribaeae (Cuba, *Britton* and *Wilson*, 5533). VIVIPARAE: 16, *A. vivipara* (Curaçao, *Boldingh*, A3). INAGUENSES: 17, *A. Nashii* (Inagua, *Nash* and *Taylor*, 1389). SISALANAE: 18, *A. sisalana* (St. Croix, *Trelease*, 27).

All of the figures are from herbarium material and enlarged two diameters.



SPINES OF WEST INDIAN AGAVES.

PLATE C.

Differences in bulbil plants.

Figure 1. A plant grown for three years from normal inflorescence bulbils of *Agave barbadensis*.

Figure 2. A plant grown for four years from the broad-leaved plantlets sometimes found in the axils of the bracts of the scape in the same species.

Both figures are comparably reduced.



1.



2.

DIFFERENCES IN BULBIL PLANTS.

PLATE D.

Agave and the Antillean Bridge.

The assumed Pleistocene land connecting Yucatan and Central America with the northeastern part of South America and its settling into an Antillean bridge of which the present West Indies are taken for vestiges. The dotted areas around the land now exposed are approximately outlined by present sounding contours and represent the land that would appear if a corresponding uniform elevation over the whole area were experienced. Connections to the north of the Greater Antilles are ignored because any union with North America that may have existed when this land is supposed to have been above the sea has been destroyed. The Bahamas stand on a more recently elevated and again submerged bank, which for a time was continuous with Cuba.

Figure 1. This map, supposing a land elevation of 12,000 feet, probably represents more land than was exposed when the first agaves entered from Yucatan. The Gulf of Mexico, the Sea of Honduras, and the Caribbean Sea are not shown here as connected with either ocean.

Figure 2. This map, supposing a subsidence to 6,000 feet above the present level, shows the bridge already separated from Yucatan and broken by the Anegada Passage, and with Jamaica cut off from Haiti, though still connected with Honduras.



1.



2.

AGAVE AND THE ANTILLEAN BRIDGE.

PLATE E.

Agave and the Antillean Bridge.

Figure 1. The Antillean Bridge at a later stage, after subsidence to 3,000 feet above the present level of the islands, showing further disruption isolating Cuba, St. Croix, Barbados, St. Lucia, and Martinique; the southernmost Caribbees still connected with the mainland, though the continental shelf to-day bears only the Leeward Islands.

This map (to be compared with the distribution table) indicates a reason why the species of St. Croix, Barbados, St. Lucia, Grenada, and Martinique are less similar than those of the islands from Anguilla to Dominica. The occurrence in the Leeward Islands of one of the Caribbaeae most closely related to the species of Antigua and Guadeloupe, and in Grenada of a species intermediate between those of Barbados and the more northern islands, do not find explanation in these maps.

Figure 2. The distribution, source, and offshoots of the principal groups of *Agave* in the West Indies, outlined in red on a map showing the supposed extent of the land at a time when they had fully traversed it. Cuba, with its wealth of forms, evidently was the primary center of dispersal. The probability that the endemic *Agave* of the Caymans will prove to be more like the Cuban than the Jamaican species, and the reason that those found on the latter island are more closely allied to Haitian than to Cuban species, are evident.

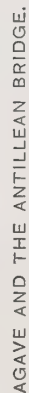


PLATE 1.

AGAVE VIVIPARA (p. 18).

[Plates B, 2, and 3 also.]

Figure 1. A reproduction of Commelin's illustration (Praelud., pl. 15, 1703) of "*Aloe americana polygona*," on which, and the accompanying description, Linnaeus based his *Agave vivipara*. Greatly reduced.

Figure 2. A reproduction of a part of Zuccagni's illustration (Collectanea Bot., vol. 1, pl. 3, 1809) of *Agave Theometel*, which appears to be the same, though the leaves are not narrowed at base. Greatly reduced.



1.



2.

AGAVE VIVIPARA.

PLATE 2.

AGAVE VIVIPARA (p 18).

(The "Koeki indian" of Curaçao.)

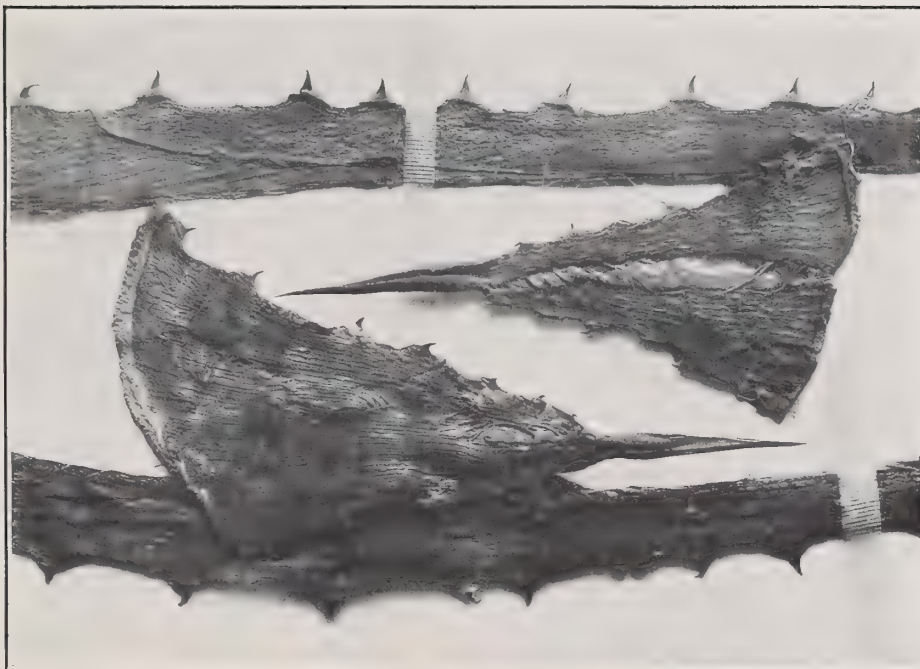
[Plates B, 1, and 3 also.]

Figure 1. Two representative plants showing the very short and broad leaves and the cespitose habit of growth, photographed by Dr. I. Boldingh. About one-twelfth natural size.

Figure 2. Two leaf-tips showing the lightly curved spine grooved from above the middle and slightly prickly on the inrolled edges toward its base; and two leaf-margins at about the middle, showing the slender prickles with widened bases raised on low prominences of the fleshy margin. (*Boldingh, A3.*) Natural size, from herbarium material.



1.



2.

AGAVE VIVIPARA.

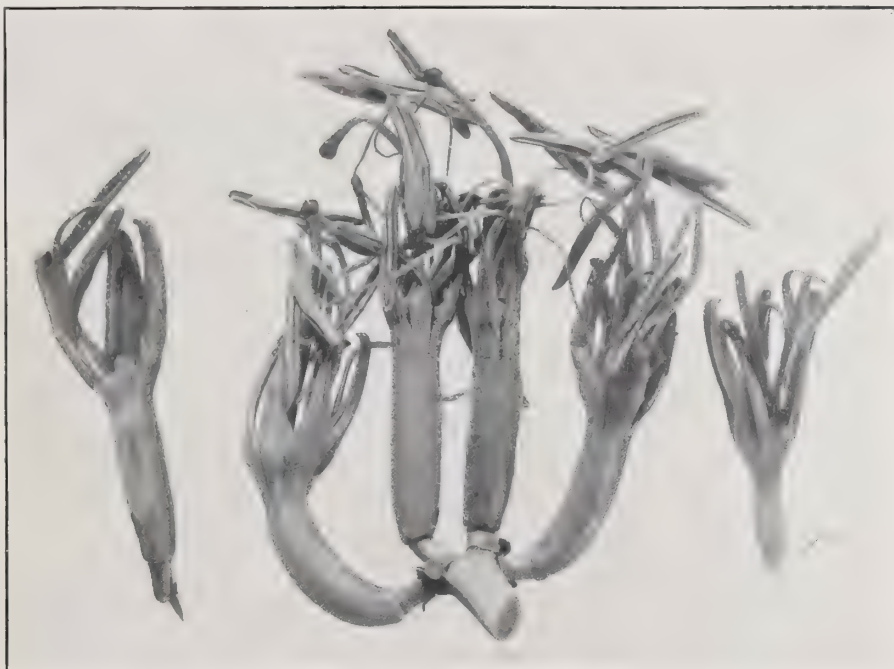
PLATE 3.

AGAVE VIVIPARA (p. 18).

[Plates B, 1, and 2 also.]

Figure 1. A cluster of flowers preserved in fluid, showing the short pedicels, oblong ovaries slightly stipitate at base, short open tube, and rather short filaments; and a flower split longitudinally to show the shallow tube with filaments inserted at its top. (*Boldingh.*) Natural size.

Figure 2. The upper part of a dried panicle branch, showing the short pedicels and short broad capsules stipitately contracted at base and very slightly beaked at top. (*Boldingh.*) Natural size.



1.



2.

AGAVE VIVIPARA.

PLATE 4.

AGAVE VICINA (p. 19).

(The "Koeki spanjool" of Aruba.)

[Plate 10 also.]

Figure 1. A plant with the lower flower buds nearly ready to open.

Figure 2. The lower part of the same plant less reduced; showing the broad triangular bracts rather crowded near the base, few rather ascending branches and the dried margins of the short broad leaves.

Both photographed by Dr. I. Boldingh.



1.

AGAVE VICINA.



2.

PLATE 5.

AGAVE COCUI (p. 19).

(The "Cocui" of Venezuela.)

[Plates 6 and 7 also.]

Figure 1. A representative plant showing the large broad plicated leaves, photographed near Carácas by Don R. Zuloaga. About one-thirtieth natural size.

Figure 2. Two leaf-tips showing respectively from front and back the conical spine grooved from about the middle and slightly prickly on the inrolled edges toward its base; and two leaf-margins at about the middle, showing the slender prickles with heavy triangular bases abruptly topping low prominences of the fleshy margin. (*Zuloaga*.) Natural size, from fresh material.



1.



2.

AGAVE COCUI.

PLATE 6.

AGAVE COCUI (p. 19).

[Plates 5 and 7 also.]

A fully developed inflorescence or "maguei" showing the separated bracts and slender horizontal branches with flowers at their ends, photographed near Carácas by Don R. Zuloaga. Greatly reduced.



AGAVE COCUI.

PLATE 7.

AGAVE COCUI (p. 19).

[Plates 5 and 6 also.]

Figure 1. Two entire flowers and one with the upper part split open, showing the short pedicels, oblong ovaries varying considerably in length and somewhat contracted at top and slightly stipitate at base, and rather long filaments inserted at the top of the shallow open tube. (*Zuloaga*, material preserved in fluid.) Natural size.

Figure 2. Two groups, each of three capsules and eight seeds, representing two collections which differ greatly in dimensions. (*Zuloaga*.) Natural size.



1.



2.

AGAVE COCUI.

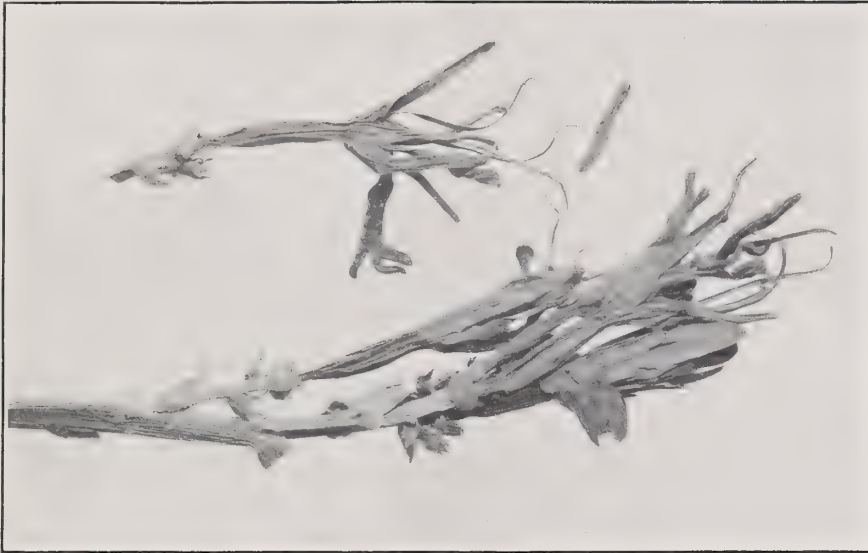
PLATE 8.

AGAVE PETIOLATA (p. 20).

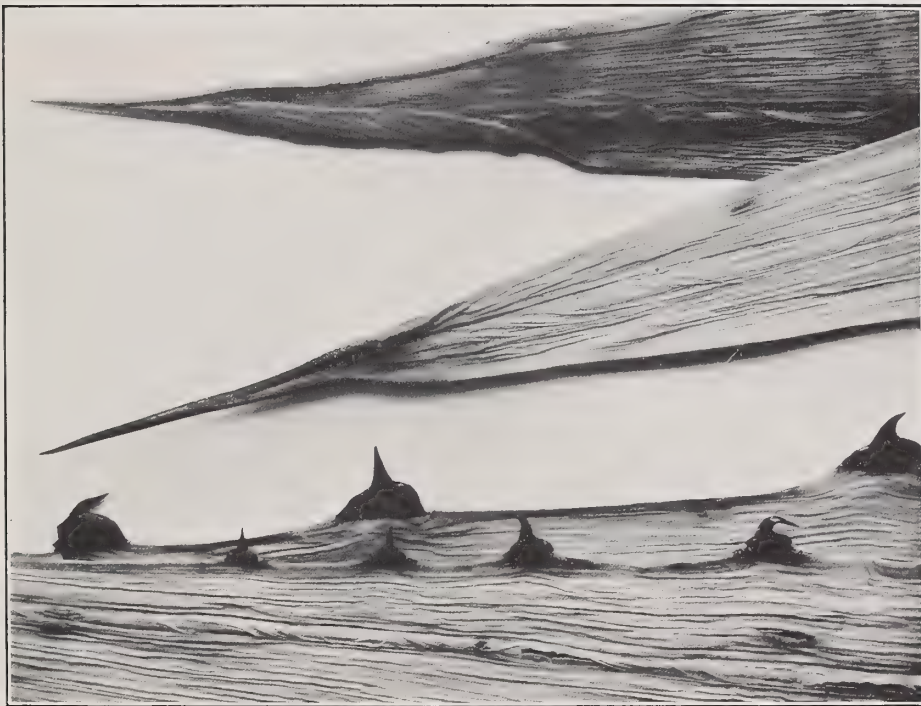
Figure 1. Fragment of an abnormal inflorescence, and a detached flower.

Figure 2. Two leaf-tips showing the slender somewhat wavy spine grooved below the middle and roughened at base; and two leaf-margins at about the middle showing the long triangular prickles from large half-round hard bases.

Both figures are from herbarium material (Curaçao, *Boldingh*), and of natural size.



1.



2.

AGAVE PETIOLATA.

PLATE 9.

AGAVE EVADENS (p. 20).

(The "Langue à boeuf" of Trinidad.)

[Plates 10 and 116 also.]

Figure 1. Several plants with panicles limited to the upper part of the scape.

Figure 2. A series of plants in vegetation, showing the shape of the leaves, which are borne at the top of a short trunk.

Both figures greatly reduced, from photographs by Capt. F. W. Urich.



1.



2.

AGAVE EVADENS.

PLATE 10.

AGAVE EVADENS? (p. 20).

[Plates 9 and 116 also.]

Figure 1. Two flowers from Margarita Island. (*Miller and Johnston, 243.*) From herbarium material, natural size.

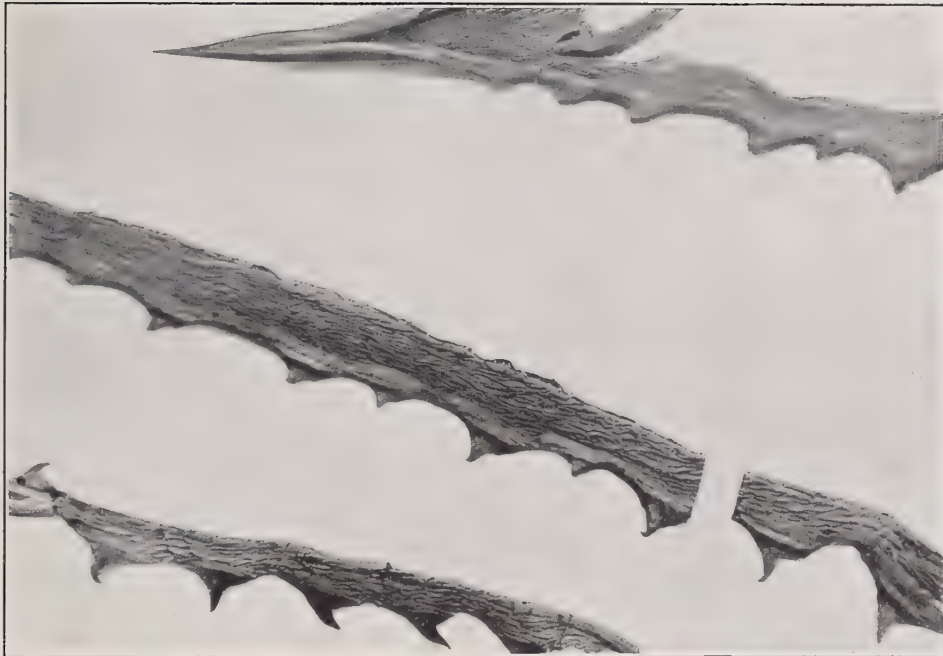
AGAVE VICINA (p. 19).

[Plate 4 also.]

Figure 2. A leaf-tip showing the conical spine grooved below the middle and with involute base which is continued as a dried border connecting the prickles; and two leaf-margins at about the middle showing the broadly triangular prickles with widened bases raised on low elevations of the fleshy or papery margin. (*Aruba, Boldingh.*) From herbarium material, natural size.



1. AGAVE EVADENS?.



2. AGAVE VICINA.

PLATE 11.

AGAVE BOLDINGHIANA (p. 21).

(The "Koeki spanjool" of Curaçao.)

[Plates 12 and 13 also.]

A hedgerow of plants with fairly developed panicles, showing the falcate triangular separated bracts and ascending branches. Photographed by Mr. E. E. Ecker.



AGAVE BOLDINGIANA.

PLATE 12.

AGAVE BOLDINGHIANA (p. 21).

[Plates 11 and 13 also.]

Figure 1. A representative plant showing the usual S-curve of the long-necked acuminate pointed relatively narrow leaves. Photographed by Dr. I. Boldingh.

Figure 2. Two leaf-tips, showing the slender curved spine grooved toward the base; and two leaf-margins, the upper one, from above the middle, showing rather heavily triangular prickles with widened bases raised on very low prominences of the fleshy margin, and the lower one, from about the middle, showing much larger prickles with the retrorse marginal prominences entirely hardened. From herbarium material of the plant shown in figure 1. (Curaçao, *Boldingh, A 2.*) Natural size.



1.



2.

AGAVE BOLDINGHIANA.

PLATE 13.

AGAVE BOLDINGHIANA (p. 21).

[Plates 11 and 12 also.]

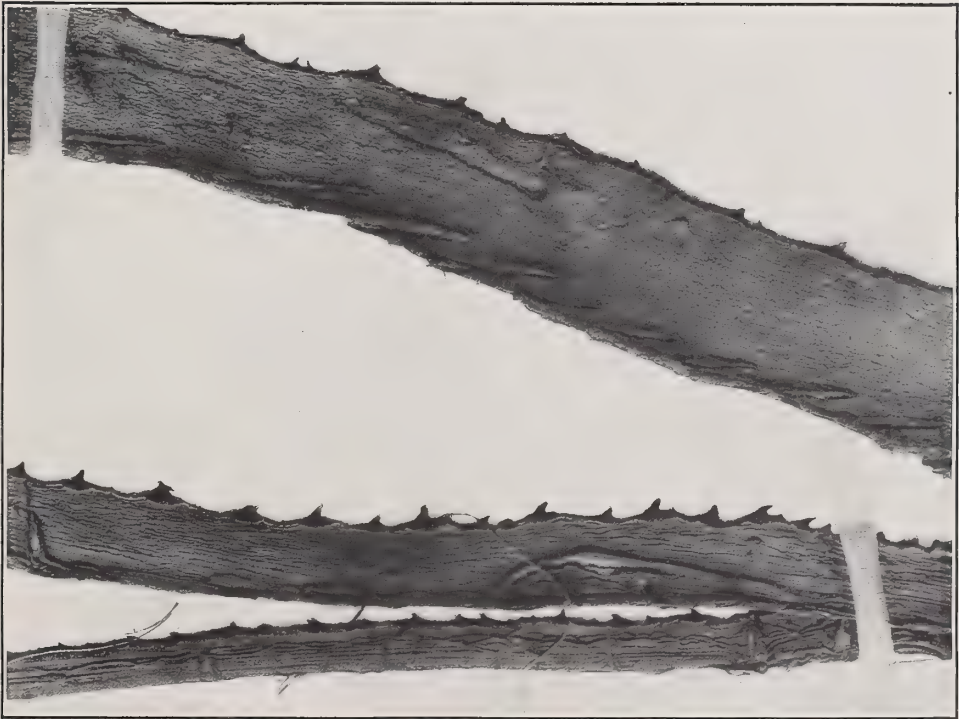
Figure 1. Three flowers, one of them opened, showing the fusiform ovary, short tube, and elongated filaments. (Curaçao, *Ecker*.)

Figure 2. Three aberrant leaf-margins with reduced papery-confluent prickles, of the corresponding but perhaps different plant of Bonaire (*Boldingh*).

Both figures are from herbarium material, and of natural size.



1.



2.

AGAVE BOLDINGHIANA.

PLATE 14.

AGAVE KARATTO (p. 23).

(The "Karatto" of St. Kitts.)

[Plates B and 15 also.]

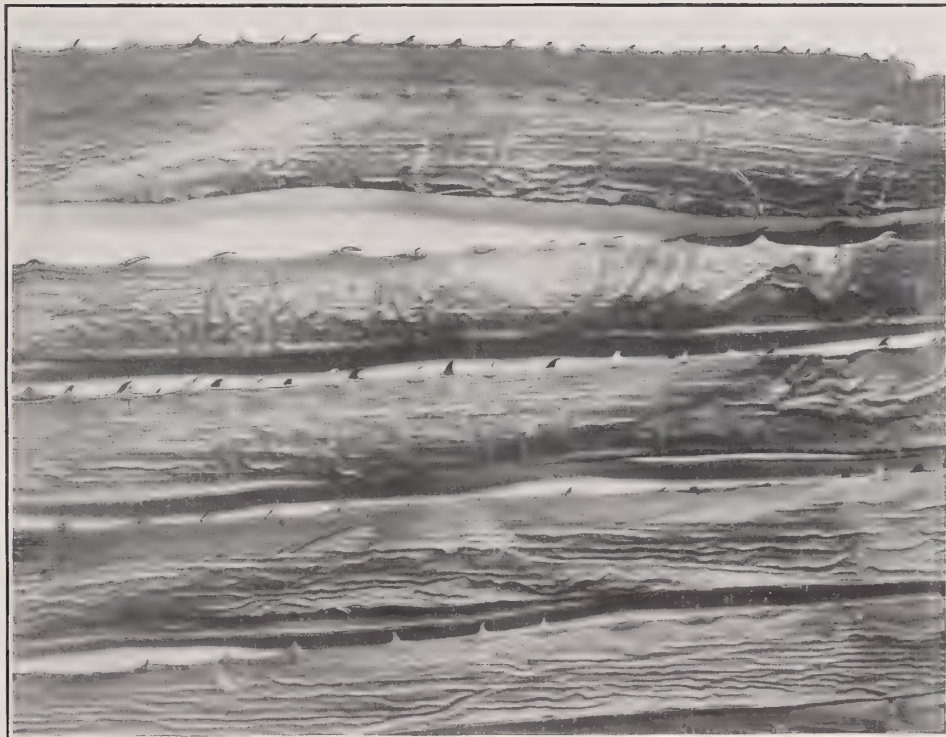
Figure 1. Several leaf-tips showing the very short mucronately recurved spine and its heavy oblong deeply slit base usually with involute margins.

Figure 2. Several portions of the margin of one leaf showing the small triangular prickles usually with their bases widened into a narrowly lens-shaped hardened part.

Both from herbarium material (*Shepherd.*) Natural size.



1.



2.

AGAVE KARATTO.

PLATE 15.

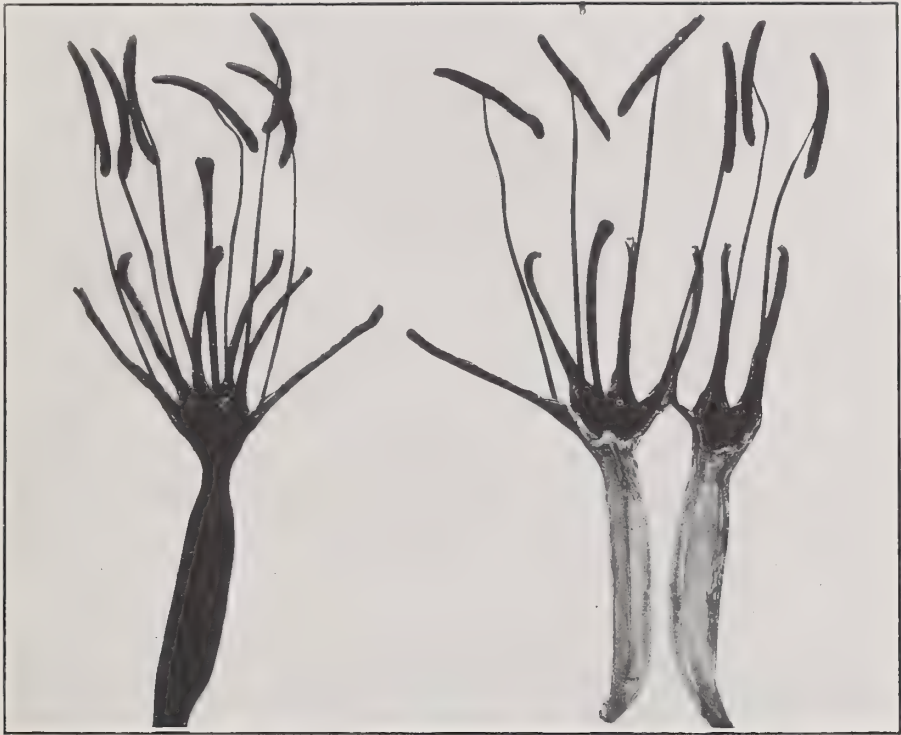
AGAVE KARATTO (p. 23).

[Plates B and 14 also.]

Figure 1. Two flowers, one of them split longitudinally, showing the oblong ovary contracted at the top and stipitately narrowed at base, shallow tube and elongated filaments inserted below its throat.

Figure 2. A withered flower, two shortly pedicelled broadly oblong capsules stipitately narrowed and short-beaked, and 18 representative seeds.

Both from herbarium material (*Shepherd*).



1.



2.

AGAVE KARATTO.

PLATE 16.

AGAVE VAN GROELAE (p. 24).

(The "Karátá" of St. Eustatius.)

[Plate 17 also.]

Figure 1. A plant showing the characteristic nearly erect leaves outcurved in age, and the stocky inflorescence with deltoid close-set bracts and heavy ascending branches with partly developed capsules at their tips. Photographed by Dr. I. Boldingh.

Figure 2. A characteristic landscape with a number of plants of this species—several of them in use for supporting the family washing of a near-by house. Photographed by Dr. I. Boldingh.



1.



2.

AGAVE VAN GROLAE.

PLATE 17.

AGAVE VAN GROELAE (p. 24).

[Plate 16 also.]

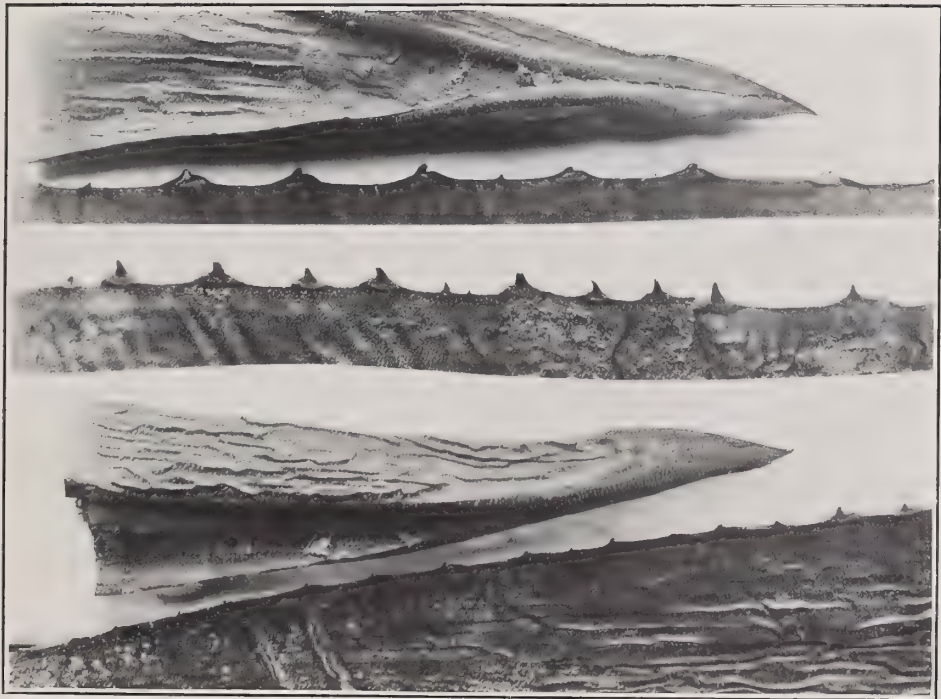
Figure 1. Three flowers, one of them opened, showing the rather short fusiform ovary, open tube, and only moderately lengthened filaments.

Figure 2. Two leaf-tips showing the slender moderately lengthened recurved spine and its heavy conical base with involute minutely prickly margin; and three parts of a leaf-margin showing the small triangular prickles with their bases lenticularly widened and rather elevated, or, near the end of the leaf, confluent in the papery margin into which the spine base is decurrent.

Both from herbarium material (*Mrs. G. Van Groel.*) Natural size.



1.



2.

AGAVE VAN GROLAE.

PLATE 18.

AGAVE MONTSERRATENSIS (p. 24).

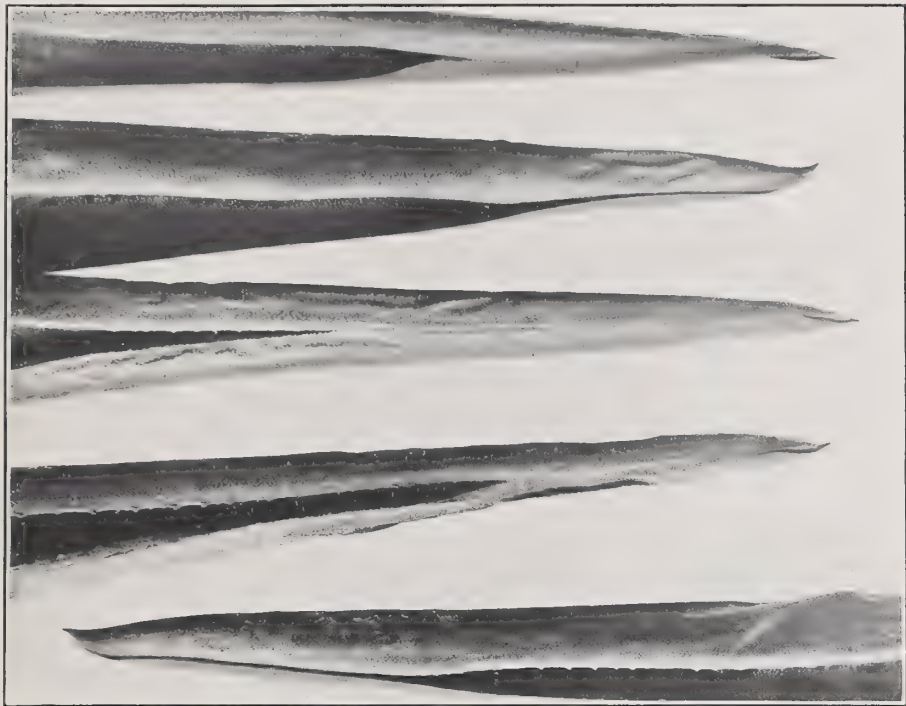
(The "Karatá" of Montserrat.)

[Plates B and 19 also.]

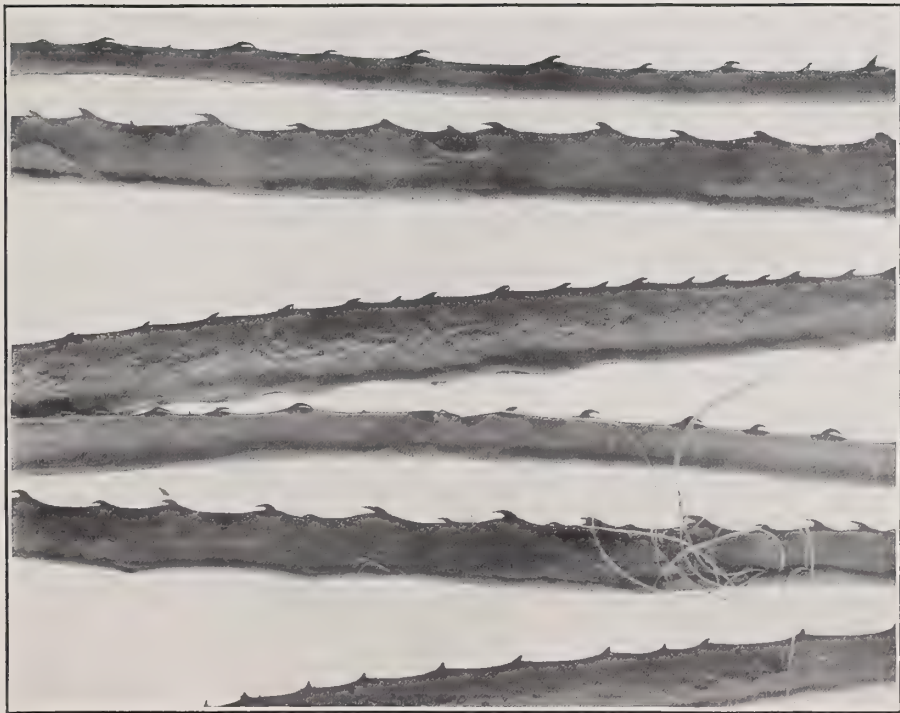
Figure 1. Several leaf-tips showing the slender rather elongated recurved spine and its heavily conical slit base with involute minutely prickly margin.

Figure 2. Several parts of the leaf-margin, at different heights, showing the very slender usually strongly recurved prickles widened at base into small lens-shaped hardened parts of the margin.

Both from herbarium material (*Robson.*) Natural size.



1.



2.

AGAVE MONTSERRATENSIS.

PLATE 19.

AGAVE MONTSERRATENSIS (p. 24).

[Plates B and 18 also.]

Figure 1. Two flowers and a partly developed capsule with withered perianth still adhering. From herbarium material (*Robson*).

Figure 2. A cluster of old capsules showing their long pedicels, and twelve seeds. From herbarium material (*Robson*).



1.



2.

AGAVE MONTSERRATENSIS.

PLATE 20.

AGAVE MEDIOXIMA (p. 24).

(The "Karatá" of Dominica.)

Figure 1. Two halves of a split flower, one seen from the back, showing the relatively short perianth. From herbarium material (*Jones*). Natural size.

Figure 2. Two pieces of a leaf-margin from near the middle showing the very small triangular prickles connected by a narrow papery margin which often bears intercalated very minute prickles. From herbarium material (*Jones*). Natural size.

Figure 3. Three leaf-tips showing the stout recurved conical spine-base with involute minutely prickly margin and blunt or suppressed apical point. From herbarium material (*Jones*). Natural size.



1.



2.



3.

AGAVE MEDIOXIMA.

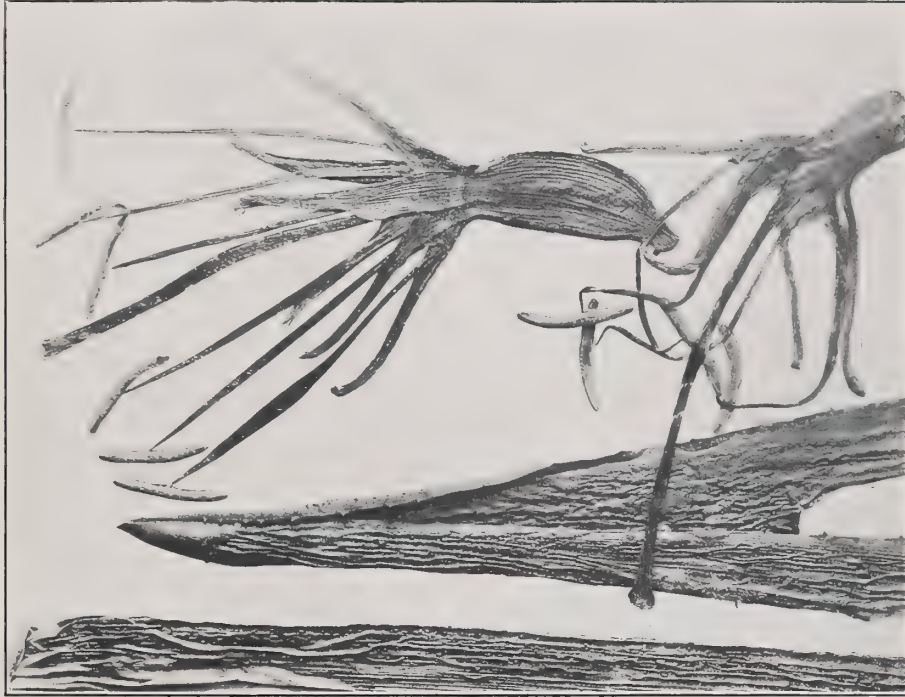
PLATE 21.

AGAVE GRENADINA (p. 25).

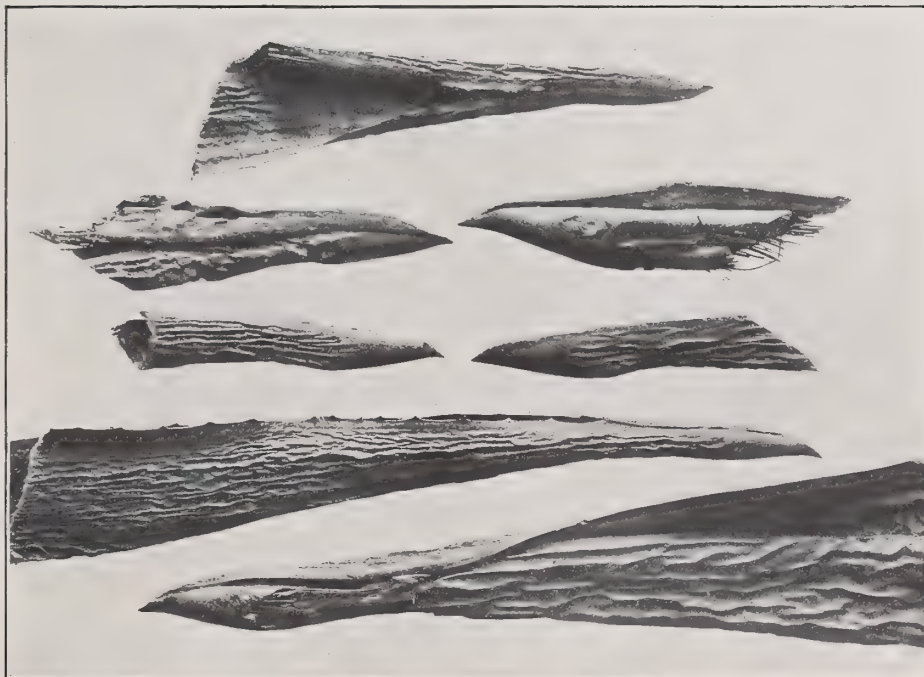
(The "Langue à boeuf" of Grenada.)

Figure 1. An entire flower with part of another, showing the very short fusiform ovary. From herbarium material (*Anstead*). Natural size.

Figure 2. Several leaf-fragments showing the short mucronately recurved spine with its thick conical slit base with involute sometimes prickly margin, and the very minute triangular prickles connected by a narrow papery margin. From herbarium material (*Anstead*). Natural size.



1.



2.

AGAVE GRENADINA.

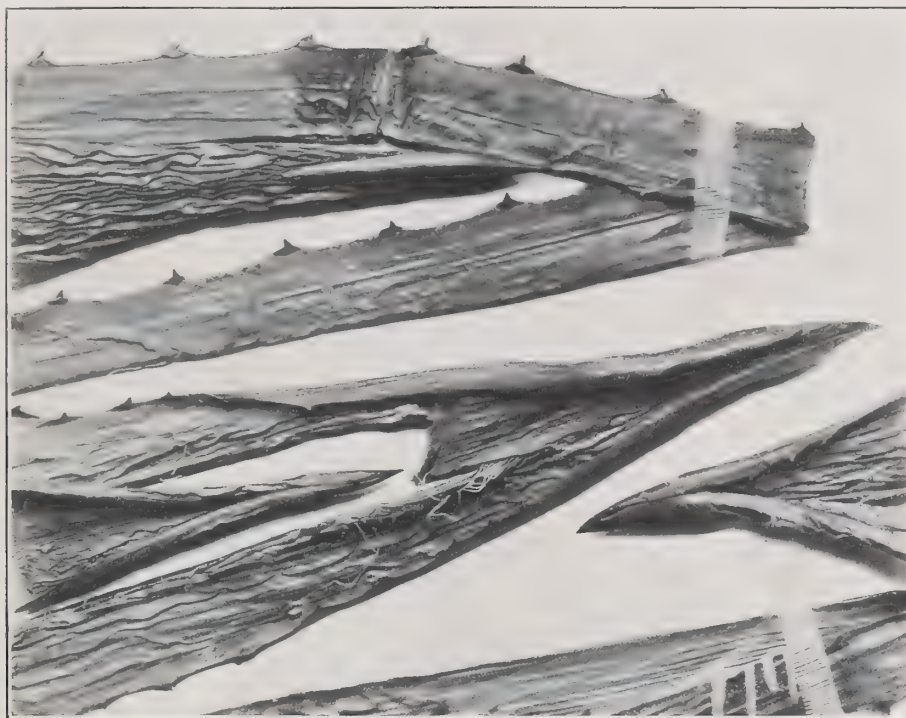
PLATE 22.

AGAVE NEVIDIS (p. 24).

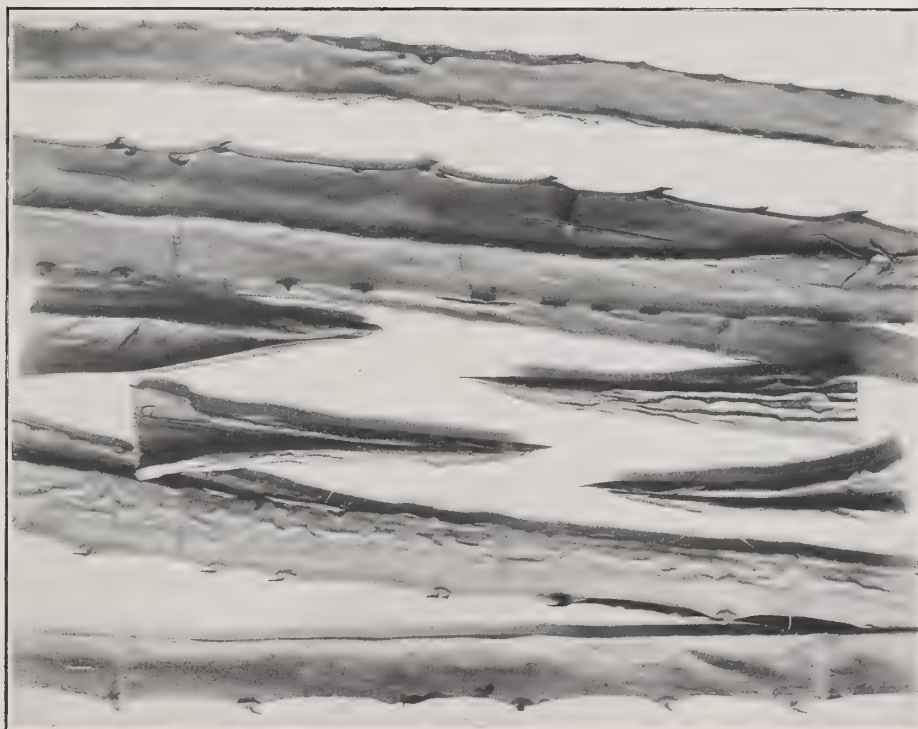
Figure 1. Four leaf-tips—one seen from the back for the deep dorsal prolongation of the hard tissue, showing the gradually tapered spine and its conical slit heavy base with involute margin below; and a representative bit of leaf-margin showing the small triangular prickles with small lenticular bases. From herbarium material (*Maloney*). Natural size.

AGAVE SCHEUERMANIANA (p. 25).

Figure 2. Four leaf-tips showing the usually slender awl-shaped spine with rather small slit involute conical base; and several leaf-margins showing the small straight or recurved prickles from lenticular bases. From herbarium material (*Owen*). Natural size.



1. AGAVE NEVIDIS.



2. AGAVE SCHEUERMANIANA.

PLATE 23.

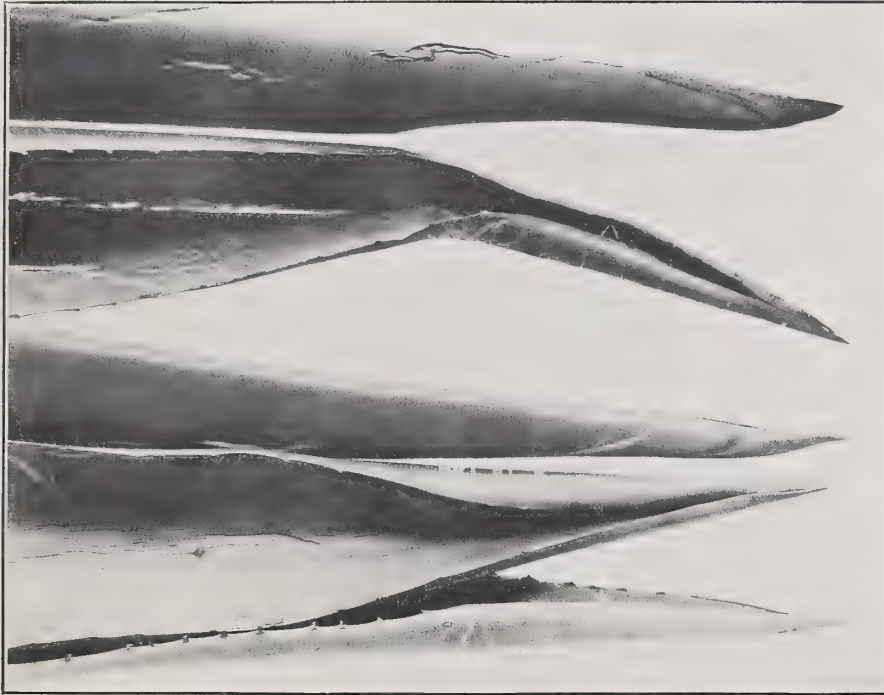
AGAVE OBDUCTA (p. 25).

(The "Karatá" of Antigua.)

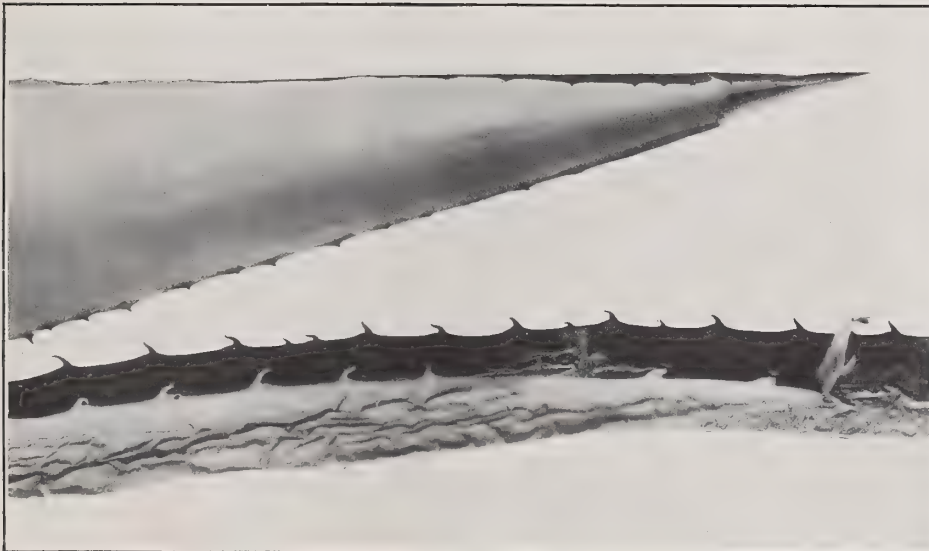
[Plates B and 24 also.]

Figure 1. Five leaf-tips, showing the short conical spine with conical involute base. From fresh material (*Jackson*).

Figure 2. A leaf-tip and the withered portion of the middle of a young leaf, showing the small straight or curved prickles little widened at the base. From fresh material (*Jackson*).



1.



2.

AGAVE OBDUCTA.

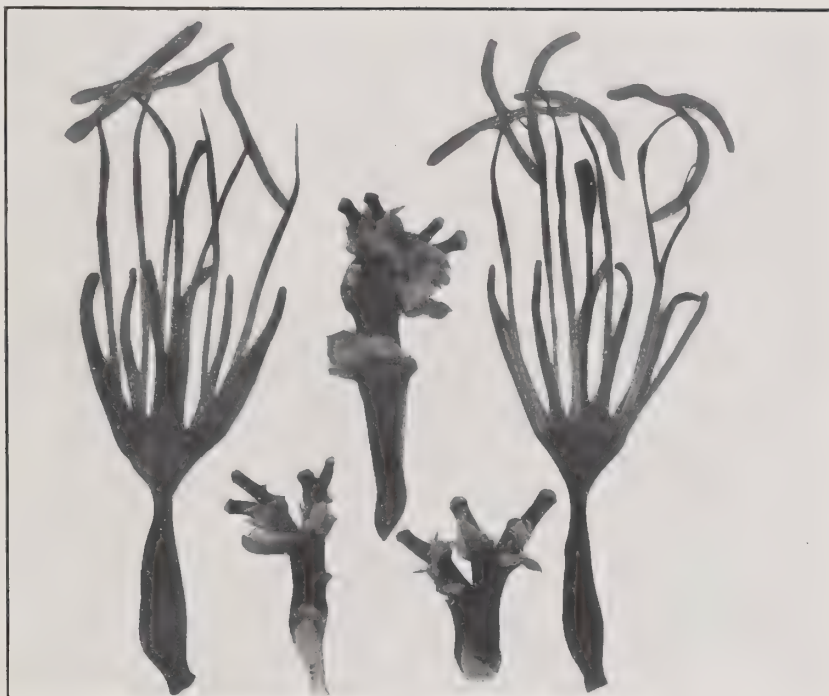
PLATE 24.

AGAVE OBDUCTA (p. 25).

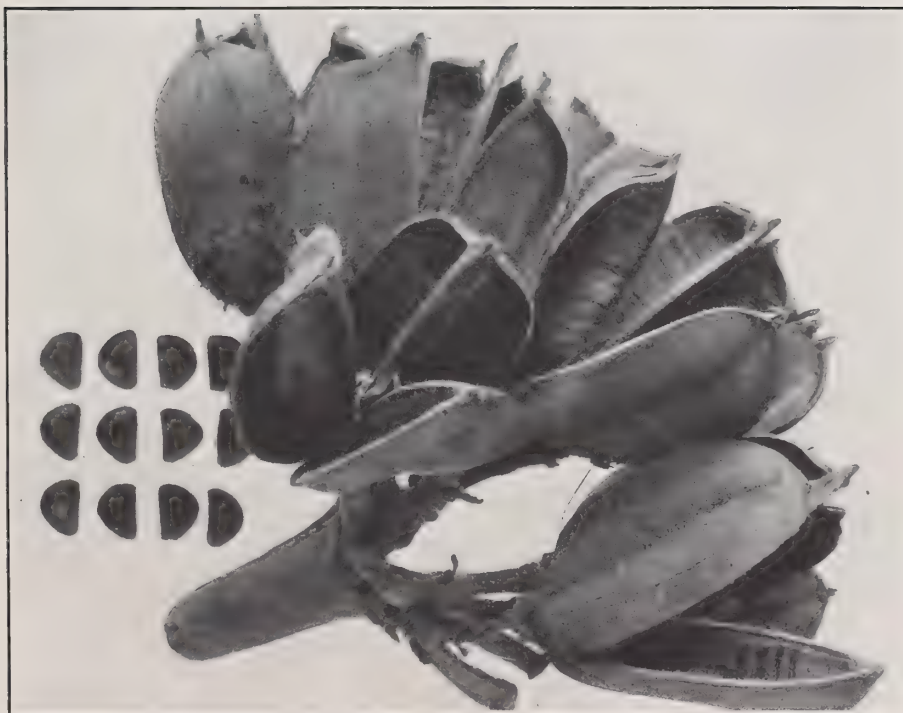
[Plates B and 23 also.]

Figure 1. Pedicels and flowers (*Antigua Wulfschlägel, 564*, in the Grisebach herbarium). From herbarium material, natural size. Photographed by permission in the Botanical Institute of the University of Göttingen.

Figure 2. A cluster of capsules showing their elongated pedicels, broad form, prominent beak, and slight stipitate contraction at base; and twelve seeds. (*Jackson.*) From herbarium material, natural size.



1.



2.

AGAVE OBDUCTA.

PLATE 25.

AGAVE TRANKEERA (p. 26).

(The "Pita de Trankeera" of the Leeward Islands.)

[Plates 26-28 also.]

A hedgerow of plants of which one is beginning to flower, showing the gradually acute plicated leaves and stocky inflorescence, with deltoid close bracts and relatively slender ascending branches. Photographed on Curaçao for Mr. E. E. Ecker. About one-fortieth natural size.



AGAVE TRANKEERA.

PLATE 26.

AGAVE TRANKEERA (p. 26).

[Plates 25, 27, and 28 also.]

Figure 1. Representative plants showing the characteristic erect leaf-habit of the group. Photographed on Curaçao by Dr. Boldingh. About one-fortieth natural size.

Figure 2. Three old panicles laden with bulbils after the flowering season. Photographed on Curaçao by Dr. Boldingh. About one-sixtieth natural size.



1.



2.

AGAVE TRANKEERA.

PLATE 27.

AGAVE TRANKEERA (p. 26).

[Plates 25, 26, and 28 also.]

Figure 1. Two flowers, showing the relative length of ovary, tube, segments, and filaments, but crushed in drying. From herbarium material (Curaçao, *Ecker*). Natural size.

Figure 2. A cluster of capsules with a single young bulbil. From material preserved in fluid (Curaçao, *Boldingh*, *K1*). Natural size.



1.



2.

AGAVE TRANKEERA.

PLATE 28.

AGAVE TRANKEERA (p. 26).

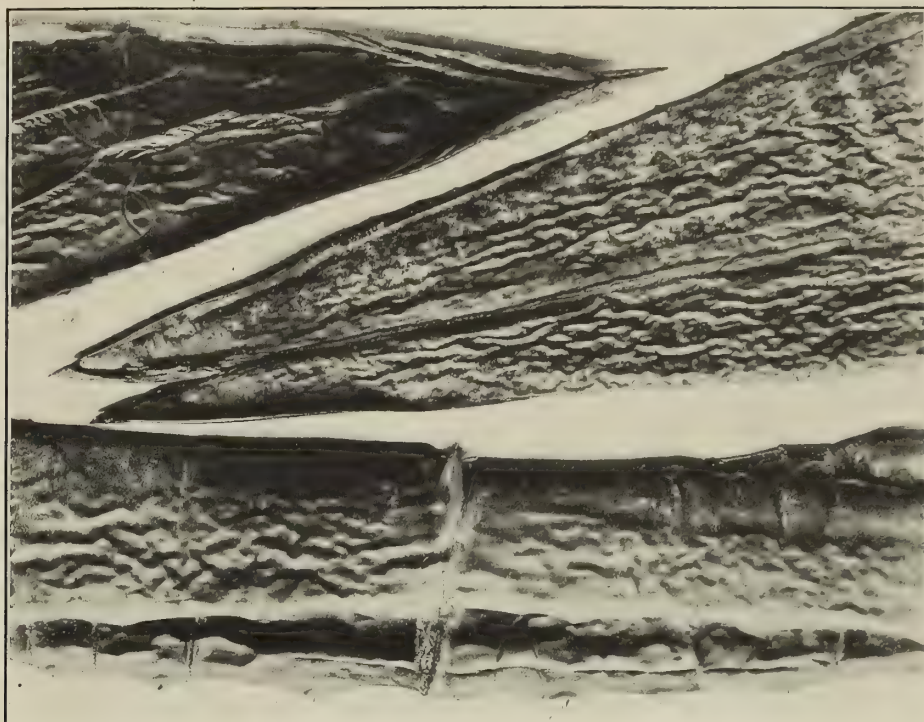
[Plates 25-27 also.]

Figure 1. Two leaf-tips, one broken open so as to show the deep slitting of the spine-base and a leaf-margin showing the small prickles somewhat lenticularly widened at base. [From herbarium material (Curaçao, *Boldingh*, 115). Natural size.]

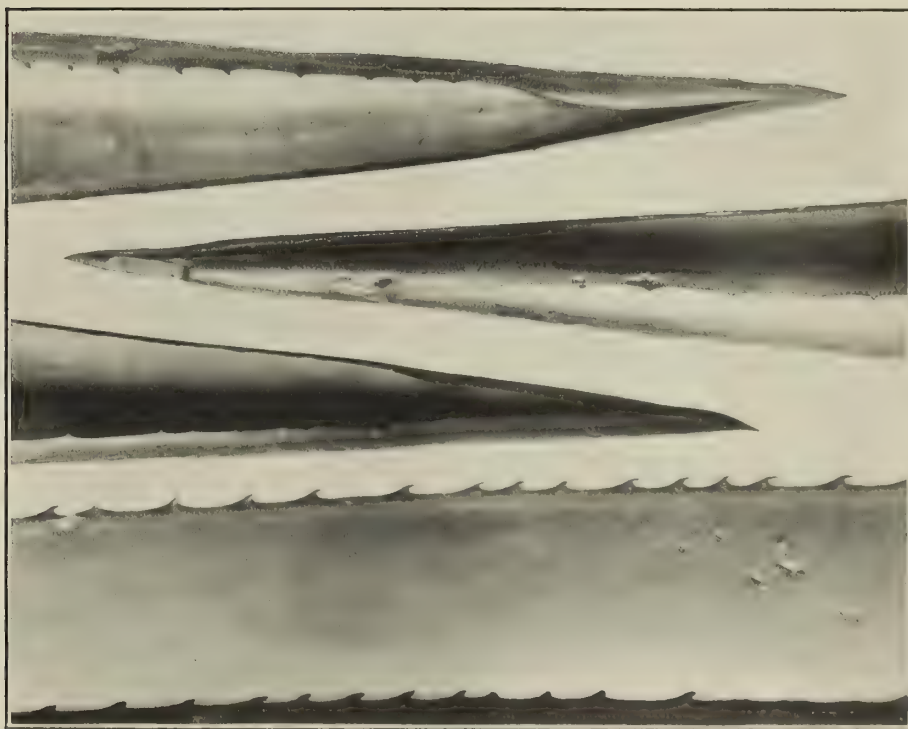
AGAVE DUSSIANA (p. 26).

[Plate 29 also.]

Figure 2. Three leaf-tips and a leaf-margin. From fresh material (Cultivated, Guadeloupe, *Mme. Carrère*). Natural size.



1. AGAVE TRANKEERA.



2 AGAVE DUSSIANA.

PLATE 29.

AGAVE DUSSIANA (p. 26).

(The "Karatá jaune" of Guadeloupe.)

[Plate 28 also.]

Figure 1. Three flowers, one with the nearer half of the perianth removed, and twelve seeds.

Figure 2. A cluster of the characteristic long-pedicelled narrowly oblong strongly stipitate capsules.

Both figures are drawn from herbarium material. Though labeled as from Martinique (*Duss*, 2136), the material here figured is apparently a part of the type number (Guadeloupe, *Duss*, 3961). Natural size.



1.



2.

AGAVE DUSSIANA.

PLATE 30.

AGAVE CARIBAEICOLA (p. 27).

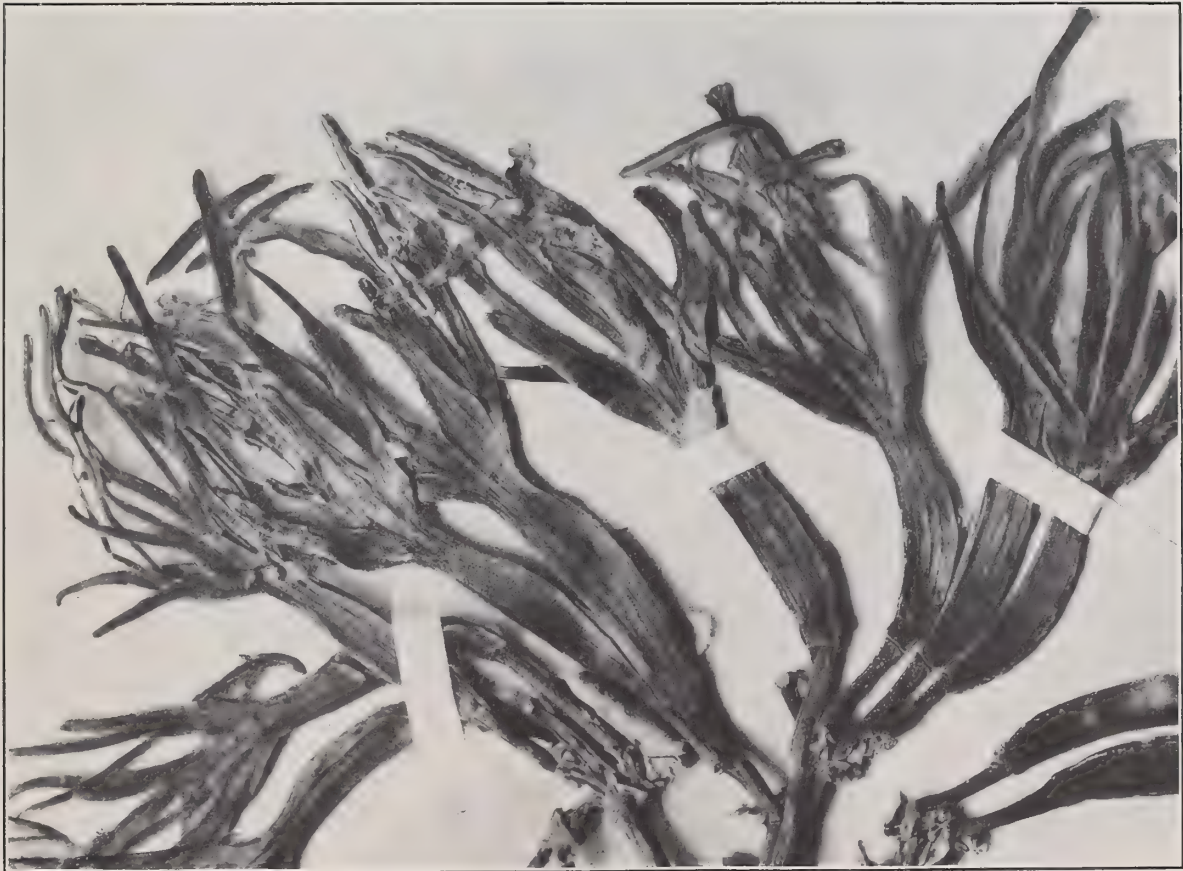
(The "Langue à boeuf" of Martinique.)

Figure 1. A leaf-tip showing the back of the narrowly conical spine with its thickened base, and the minute prickles; and the end of a branch of an inflorescence with a number of rough-dried flowers showing their long pedicels, open rather short tube, and short filaments. Photographed, by permission, in the herbarium at Kew. (Martinique, *Hahn*, 114.) It is the type of *Agave caribaea*, when described in 1888 by Mr. Baker, as to its inflorescence.

Figure 2. A cluster of pressed flowers, photographed, by permission, in the herbarium of the Naturhistorisches Hofmuseum at Vienna. (Martinique, *Hahn*, 114.)



1.



2.

AGAVE CARRIBACICOLA.

PLATE 31.

AGAVE EGGERSIANA (p. 28).

(The "Corita" of St. Croix.)

[Plates 32 and 33 also.]

A hedge row of plants showing the ascending narrow gradually acute leaves, outcurving in age, and a flowering specimen showing the slender scape with narrow refracted bracts and slender ascending branches with rather densely clustered flowers. Photographed at Bassin St. Croix, by the author. About one-fortieth natural size.



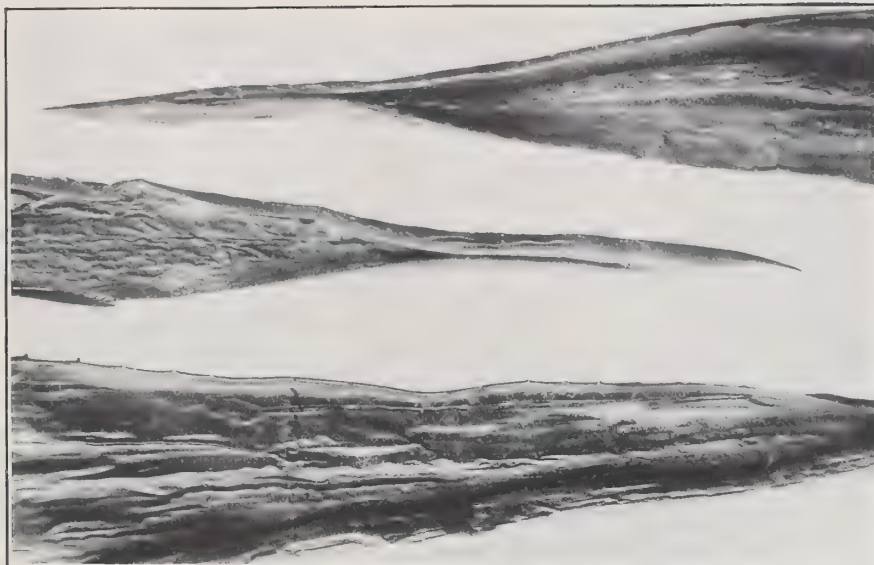
AGAVE EGGERSIANA.

PLATE 32.

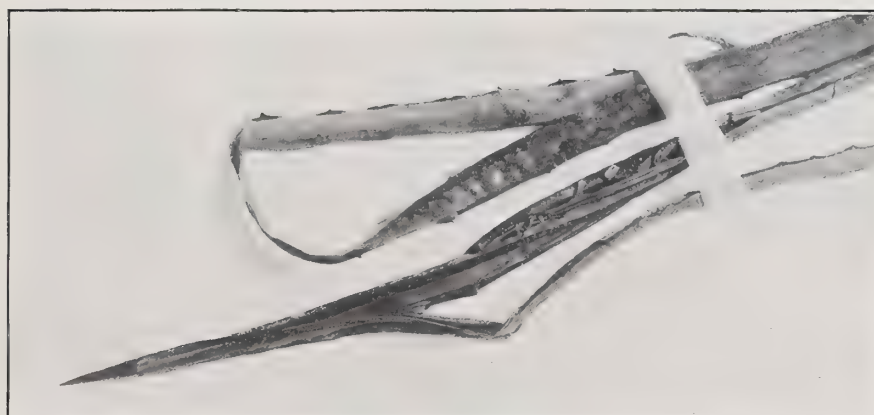
AGAVE EGGERSIANA (p. 28).

[Plates 31 and 33 also.]

Figures 1, 2, and 3. Several leaf-tips and margins, showing the conical spine with slender conical or compressed base with involute entire or minutely prickly margin, and the small nearly straight prickles with small lens-shaped hard bases in the green margin. From herbarium material (*Trelease*). Natural size.



1.



2.



3.

AGAVE EGGERSIANA.

PLATE 33.

AGAVE EGGERSIANA (p. 28).

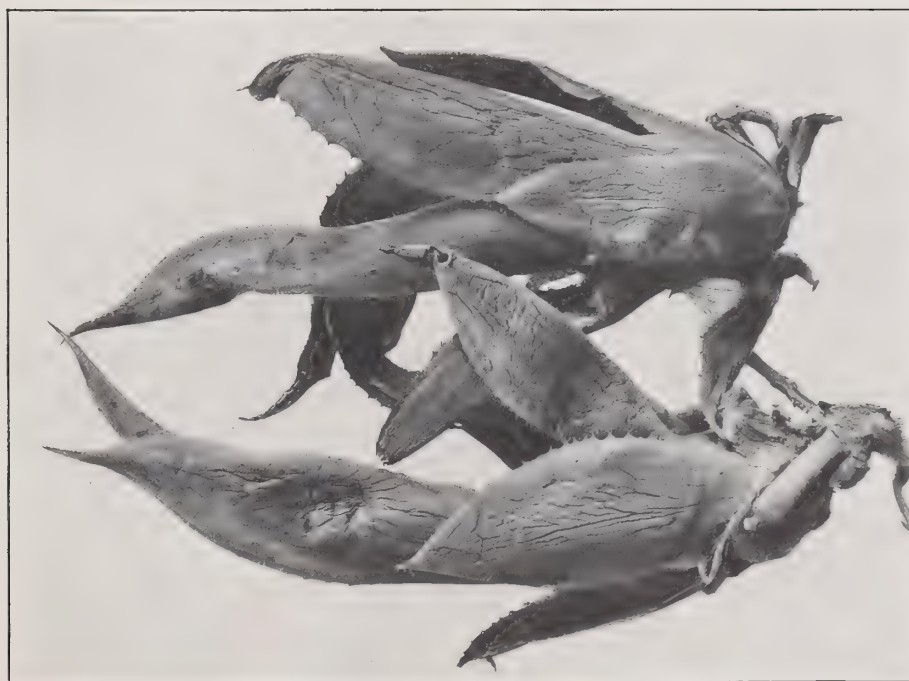
[Plates 31 and 32 also.]

Figure 1. Two portions of a leaf, one of them showing the small prickles; and several flowers showing the rather short ovary, very open shallow tube, and elongated filaments. From herbarium material (*Ricksecker, 282*). Natural size.

Figure 2. Two somewhat wilted bulbils, one of them still attached to a fragment of the panicle bearing a pedicel from which a flower has fallen. From specimen cultivated on St. Thomas (*Trelcase*). Natural size.



1.



2.

AGAVE EGGERSIANA.

PLATE 34.

AGAVE BARBADENSIS (p. 28).

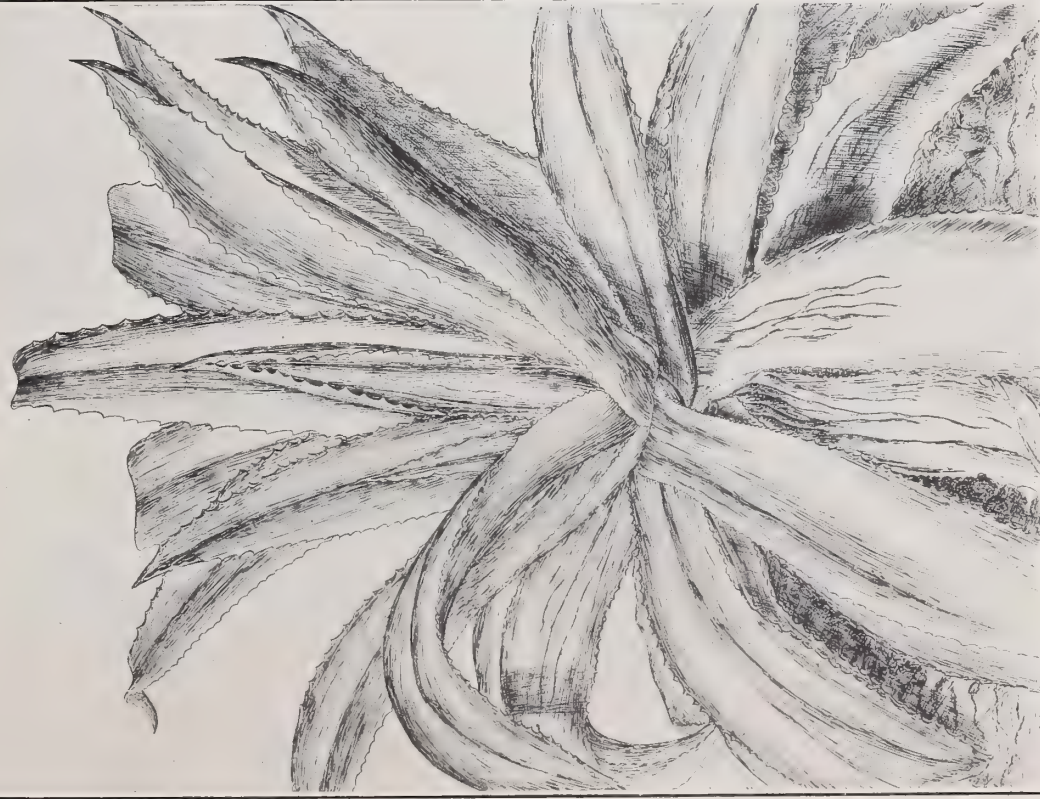
(The "May pole" of Barbados.)

[Plates C, 35-38, 65, and 107 also.]

Figure 1. A reproduction of Dillenius's illustration (Hort. Elthamensis, vol. 1, pl. 19, 1732) of his "*Aloe barbadensis mitior, laete virens et splendens*." Reduced.

Figure 2. A very luxuriantly developed specimen with broader more plicately channeled and more abruptly acute leaves than usual. Photographed by Mr. F. A. Stockdale. About one-thirtieth natural size.

Alie Barbadosis mitior, lecte virens & Splendens.



1

AGAVE BARBADENSIS.



2.

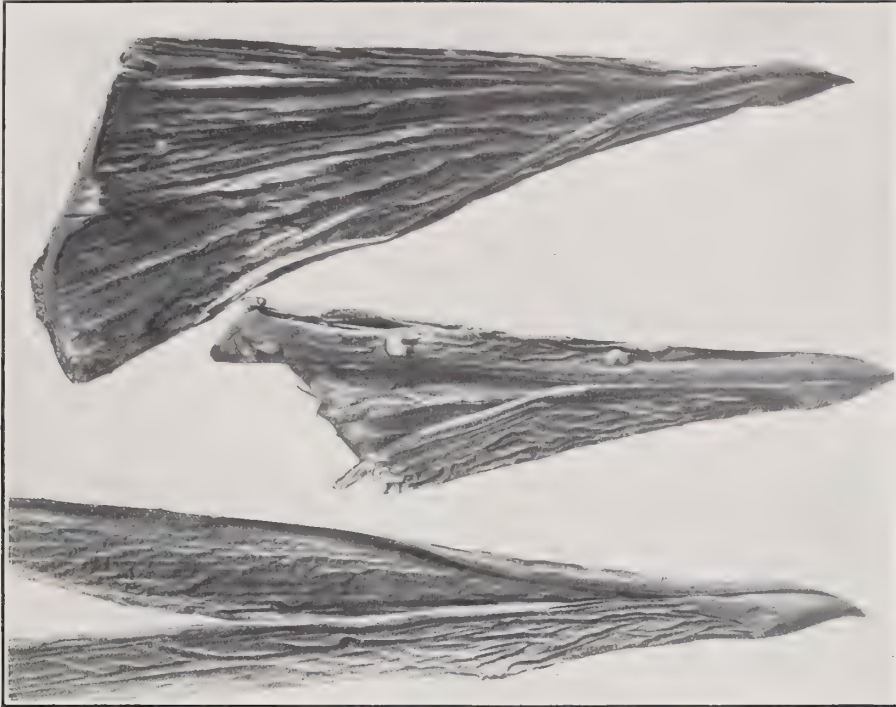
PLATE 35.

AGAVE BARBADENSIS (p. 28).

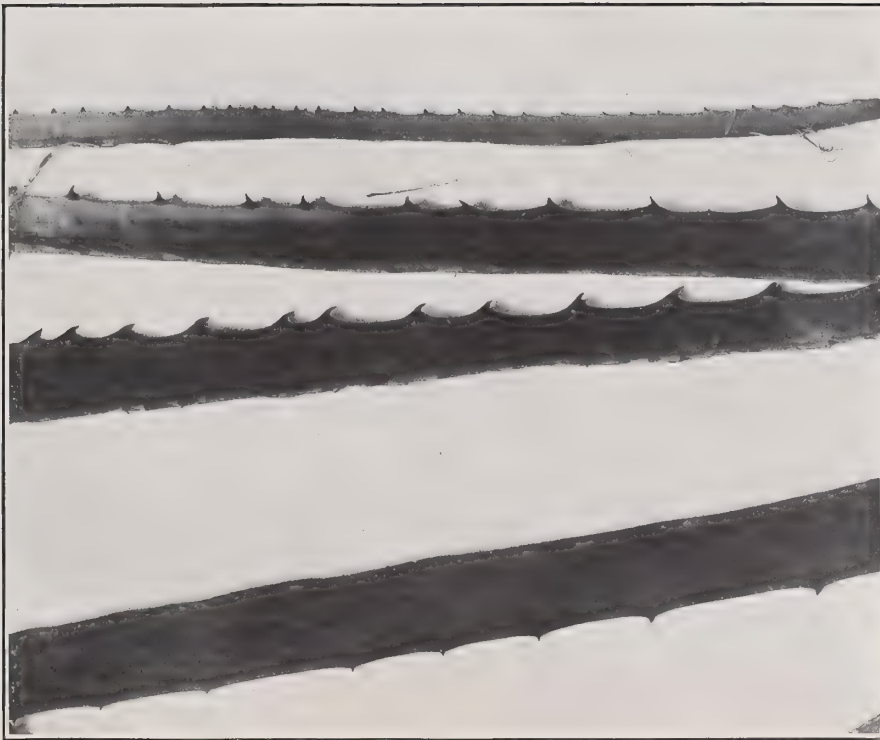
[Plates C, 34, 36-38, 65, and 107 also.]

Figure 1. Three leaf-tips showing the short acuminate pointed and recurved spine with stoutly conical slit base. From herbarium material (*Trelease*).

Figure 2. Several parts of a leaf-margin showing the small straight or curved prickles from lenticular bases. From herbarium material (*Trelease*).



1.



2.

AGAVE BARBADËNSIS.

PLATE 36.

AGAVE BARBADENSIS (p. 28).

[Plates C, 34, 35, 37, 38, 65, and 107 also.]

A hedgerow of plants of which four have developed panicles, showing the rather stout scape with deltoid appressed bracts and ascending branches. Photographed by Mr. F. A. Stockdale.



AGAVE BARBADENSIS.

PLATE 37.

AGAVE BARBADENSIS (p. 28).

[Plates C, 34-36, 38, 65, and 107 also.]

Plants with old scapes showing the broad bracts still appressed if present; one panicle densely filled with bulbils which succeeded the flowers. Photographed by the author.



AGAVE BARBADENSIS.

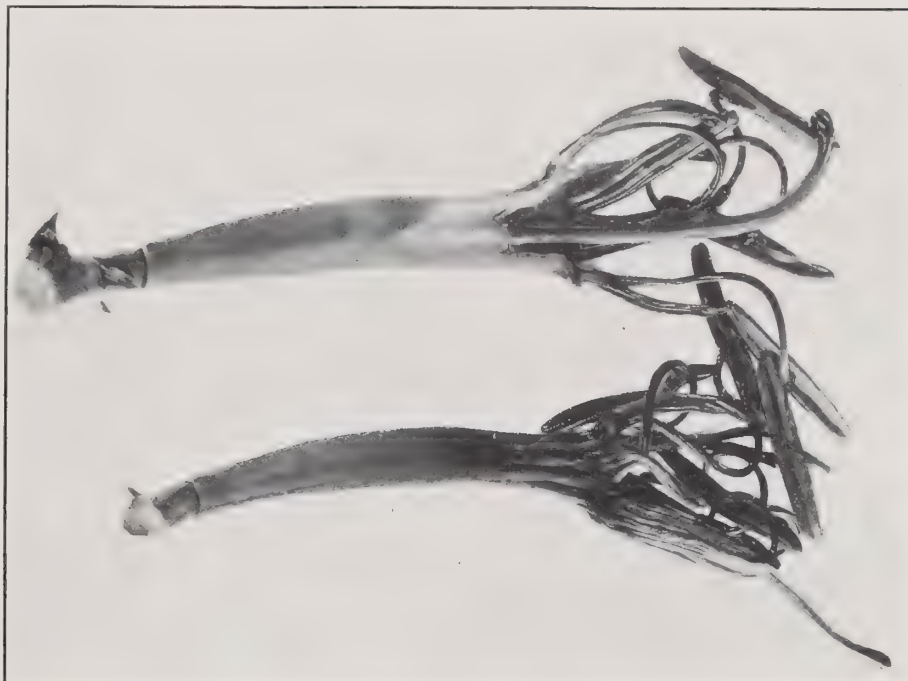
PLATE 38.

AGAVE BARBADENSIS (p. 28).

[Plates C, 34-37, 65, and 107 also.]

Figure 1. Two flowers showing the short pedicels, elongated ovaries somewhat contracted at top and immediately above the base, deep tube becoming wrinkled in age, and rather short filaments. From material preserved in fluid (*Todd, Stockdale, and Bovell*). Natural size.

Figure 2. A fragment of an inflorescence showing several bulbils and numerous pedicels from which flowers have fallen. Somewhat wilted material (*Todd, Stockdale, and Bovell*). Natural size.



1.



2.

AGAVE BARBADENSIS.

PLATE 39.

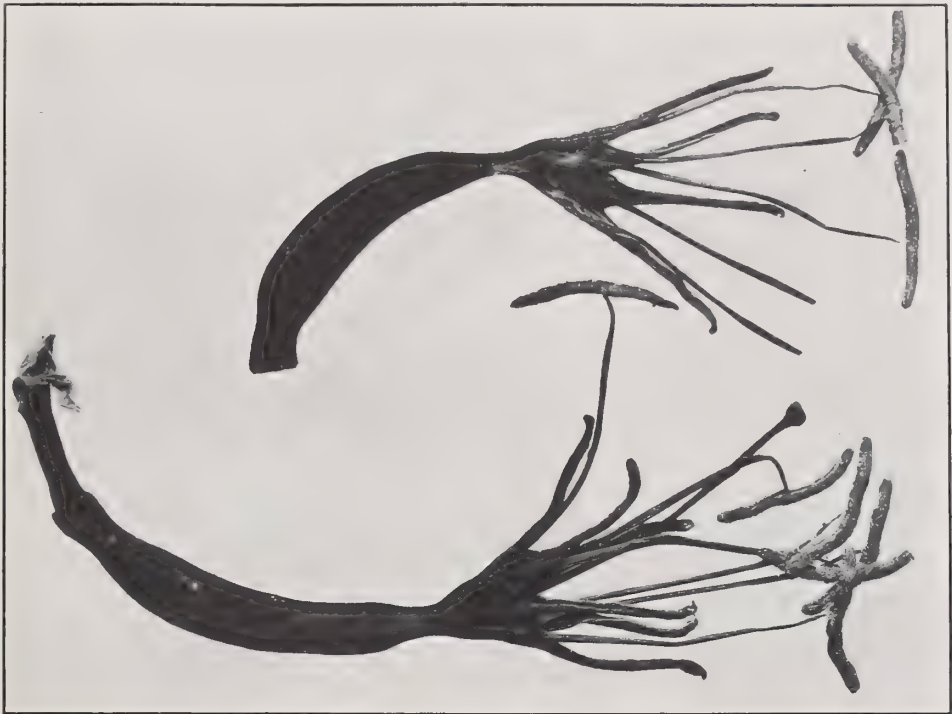
AGAVE UNGUICULATA (p. 29).

(The "Langue à boeuf" of St. Lucia.)

[Plate B also.]

Figure 1. Two flowers showing the rather long pedicel, fusiform ovaries (differing considerably in length) strongly contracted at top and above the base, deep tube, and moderately long filaments. From herbarium material (*Moore*). Natural size.

Figure 2. Two leaf-tips showing the short thick unguiculately recurved openly very flat-grooved spines, unlike those of most Caribaeae; and several parts of a leaf-margin showing the small triangular prickles on very slightly raised hardened prominences. From herbarium material (*Moore*). Natural size.



1.



2.

AGAVE UNGUICULATA.

PLATE 40.

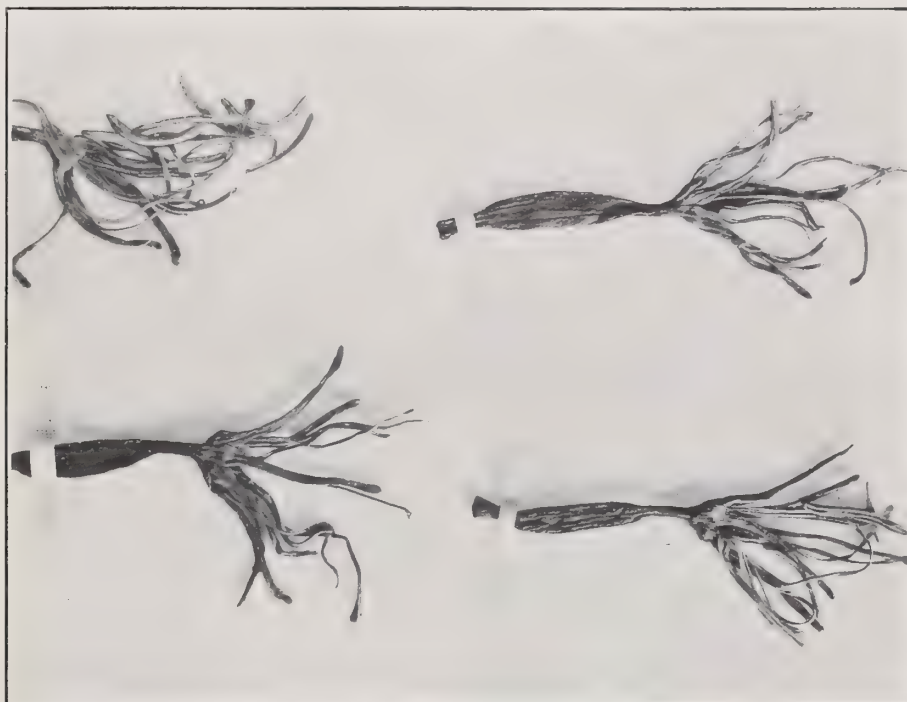
AGAVE VENTUM-VERSA (p. 29).

(The "Langue à boeuf" of St. Vincent.)

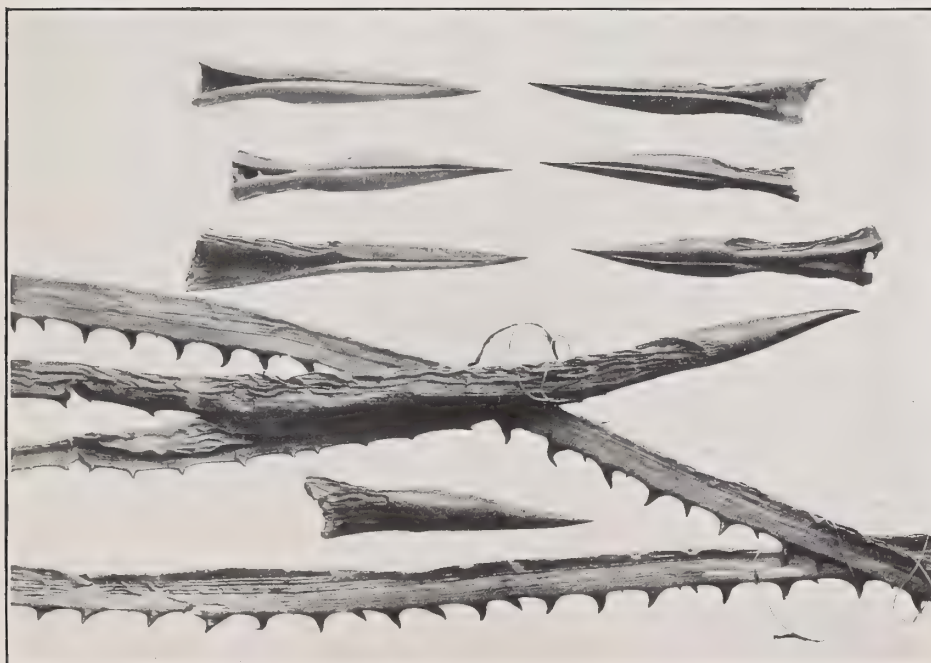
[Plate B also.]

Figure 1. Several rather poorly pressed flowers showing the fusiform ovary very much contracted at top and above the base, very shallow tube, and short filaments. From herbarium material (*H. H. and G. W. Smith, 1705*). Natural size.

Figure 2. Several leaf-tips, one seen in profile and one from the back, showing the very stout involute slit spine hardened into the green tissue of the back of the leaf; and parts of a leaf-margin, showing the broad triangular irregular prickles from widened bases or confluent and with small intervening cusps. From herbarium material (*Sands*). Natural size.



1.



2.

AGAVE VENTRUM VERSA.

PLATE 41.

AGAVE ANTILLARUM (p. 31).

[Plates 42 and 43 also.]

A photographic copy of Descourtilz's colored illustration (Fl. Antilles, vol. 4, pl. 284, 1827). No commentary is necessary beyond saying that the apparent variegation is intended to indicate the impressions made by the margins of contiguous leaves before expansion.



AGAVE ANTILLARUM.

PLATE 42.

AGAVE ANTILLARUM (p. 31).

[Plates 41 and 43 also.]

Figure 1. A leaf-tip showing the slenderly conical somewhat wavy spine narrowly slit at the base, and the narrowly triangular rather straight prickles lenticularly hardened into the margin. From herbarium material (Santo Domingo, *Parry, Wright, and Brummel.*) Natural size.

Figure 2. Four flowers, of which one is split, one has the tube opened, and one is seen from above, showing the fusiform ovary, very shallow tube and rather short filaments. From herbarium material (Santo Domingo, *Parry, Wright, and Brummel.*) Natural size.



1.



2.

AGAVE ANTILLARUM.

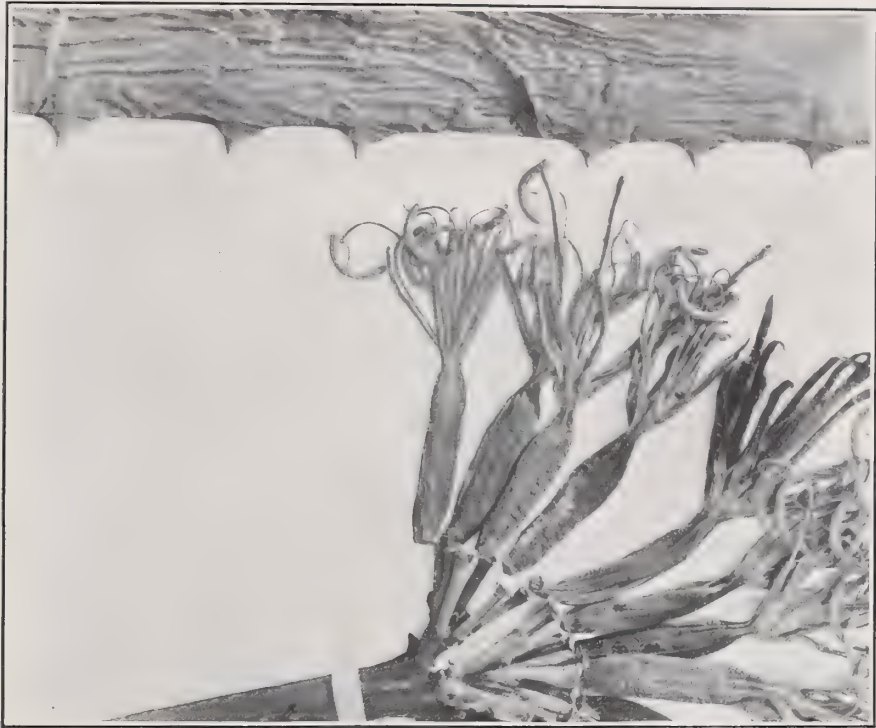
PLATE 43.

AGAVE ANTILLARUM (p. 31).

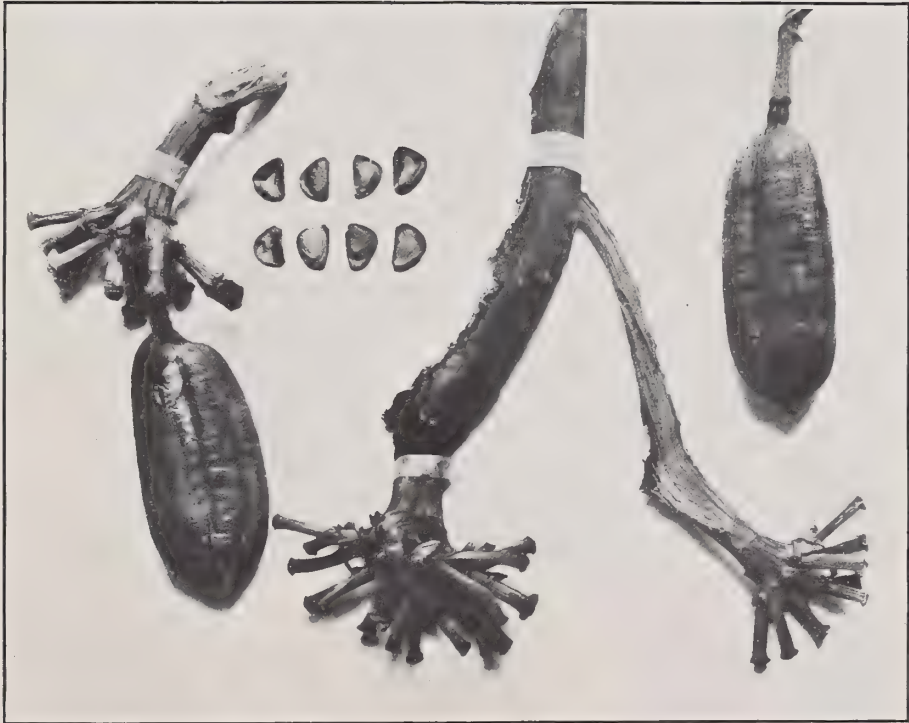
[Plates 41 and 42 also.]

Figure 1. A panicle fragment showing the moderately long pedicels and closely clustered flowers. Photographed by permission in the United States National Herbarium. Natural size. It is uncertain whether the leaf margin at top, with heavy triangular prickles from rounded bases, belongs with these flowers and thus indicates a greater range in prickles variation than is otherwise known, or with those figured elsewhere (pl. 64) as *Agave intermixta*.

Figure 2. Panicle fragments with two elongated capsules and eight seeds. From herbarium material (*Parry, Wright, and Brummel*). Natural size.



1.



2.

AGAVE ANTILLARUM.

PLATE 44.

AGAVE SOBOLIFERA? (p. 32).

[Plates B and 45-48 also.]

A reproduction of the "*Aloe americana sobolifera*" of Hermann (Hort. Lugd.-Bat. Cat., No. 17, 1687). Evidently fancifully drawn, and not very closely identifiable with any known *Agave*, though rather one of the *Antillanae* than anything else.



AGAVE SOBOLIFERA.

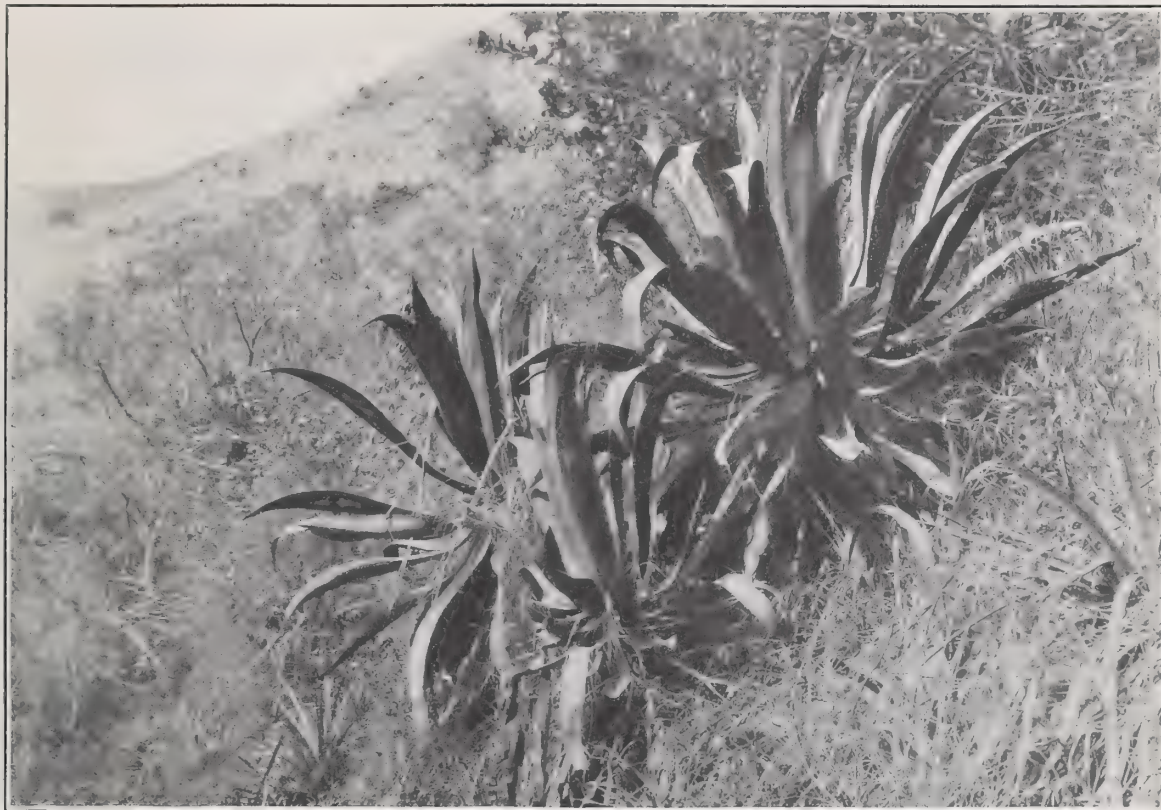
PLATE 45.

AGAVE SOBOLIFERA (p. 32).

(The common "Coratoe" of Jamaica.)

[Plates B, 44, and 46-48 also.]

Figures 1 and 2. Two pictures, representing the great difference in appearance shown by individual plants of what is commonly called *Agave Morrisii*; those represented by figure 1, spontaneous between Papine Corner and Gordontown, and the one represented by figure 2 cultivated at Hope Gardens, Kingston, both in Jamaica. Photographed by the author. About one-fifteenth natural size.



1.



2.

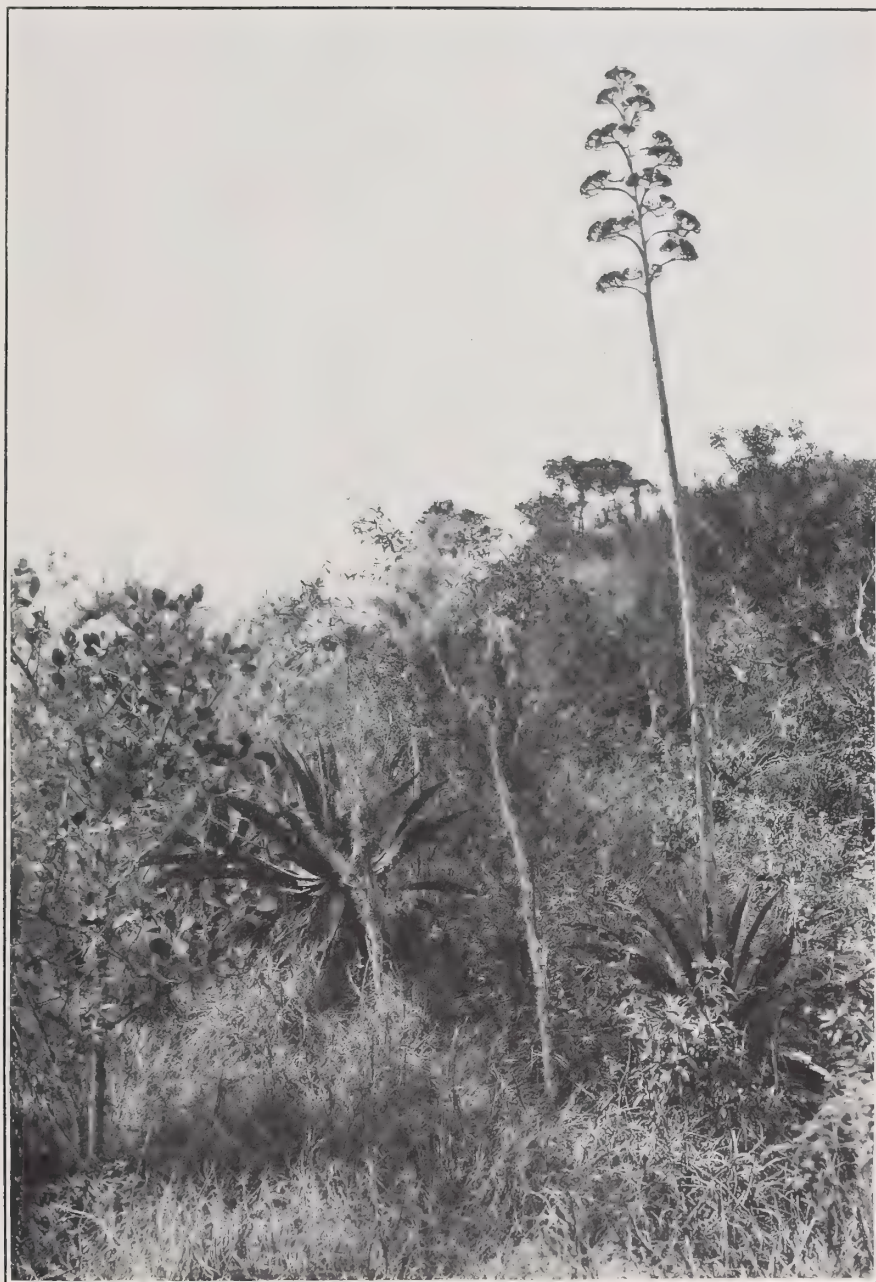
AGAVE SOBOLIFERA.

PLATE 46.

AGAVE SOBOLIFERA (p. 32).

[Plates B, 44, 45, 47, and 48 also.]

Two plants, one with young inflorescence, showing the characteristic S-curvature of the leaves and the moderately stout elongated scape with narrowly triangular spreading or refracted bracts. Photographed between Papine Corner and Gordontown, Jamaica, by the author. About one-fortieth natural size.



AGAVE SOBOLIFERA.

PLATE 47.

AGAVE SOBOLIFERA (p. 32).

[Plates B, 44-46, and 48 also.]

Part of an inflorescence, the nearer part of one flower removed, showing the short pedicels, cup-shaped tube so shallow that the moderately long filaments appear to be inserted well toward its bottom, and the goblet-shaped outline of the flowers. From fresh material collected near the Hope Gardens at Kingston, Jamaica. Natural size.



AGAVE SOBOLIFERA.

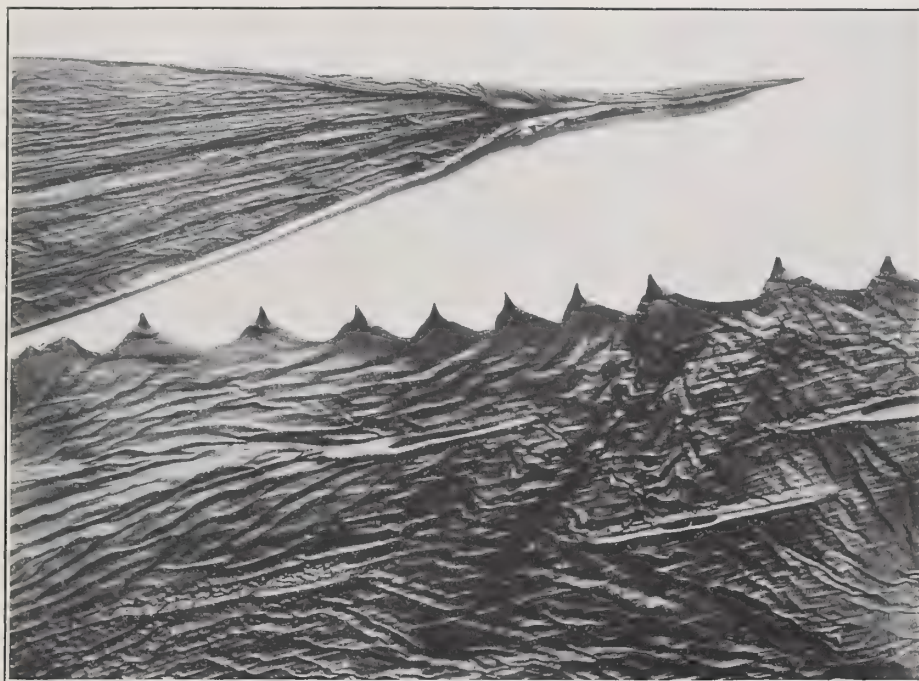
PLATE 48.

AGAVE SOBOLIFERA (p. 32).

[Plates B and 44-47 also.]

Figure 1. A leaf-tip showing the slender conical slit-based spine, and a margin showing the triangular prickles somewhat widened onto the tops of prominent green hummocks. Herbarium material (*Trelease*). Natural size.

Figure 2. A cluster of capsules showing their marked stipe and apex; ten seeds; and two young bulbils. From fresh material (*Harris*). Natural size.



1.



2.

AGAVE SOBOLIFERA.

PLATE 49.

AGAVE MORRISII (p. 33).

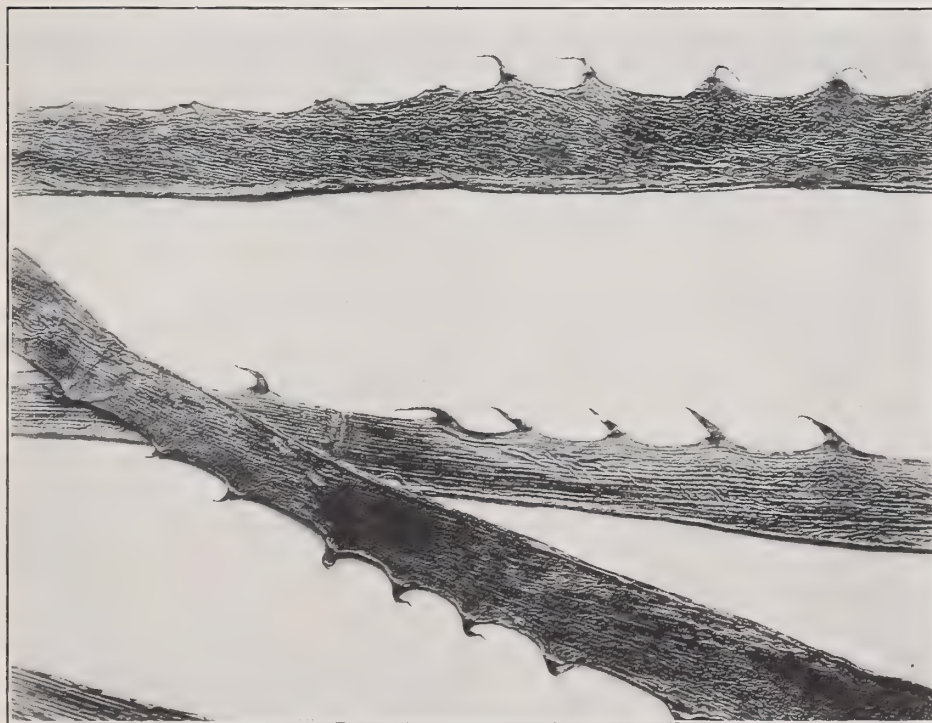
(The broad-petaled "Coratoe" of Jamaica.)

Figure 1. Three flowers showing the very fusiform ovary, broad tube, and wide-based perianth segments. From herbarium material (Port Henderson, *Harris*, 10156). Natural size.

Figure 2. Portions of a leaf-margin showing the slender, elongated, mostly refracted or retrorse prickles, little widened at base. From herbarium material (Port Henderson, *Harris*, 10156). Natural size.



1.



2.

AGAVE MORRISII.

PLATE 50.

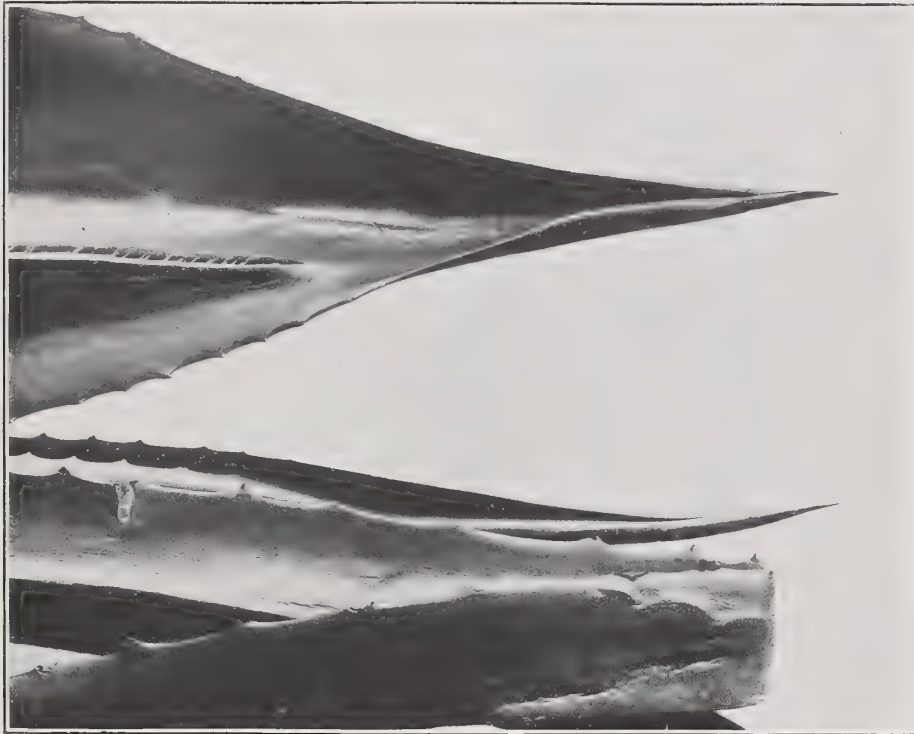
AGAVE HARRISII (p. 34).

[Plate 51 also.]

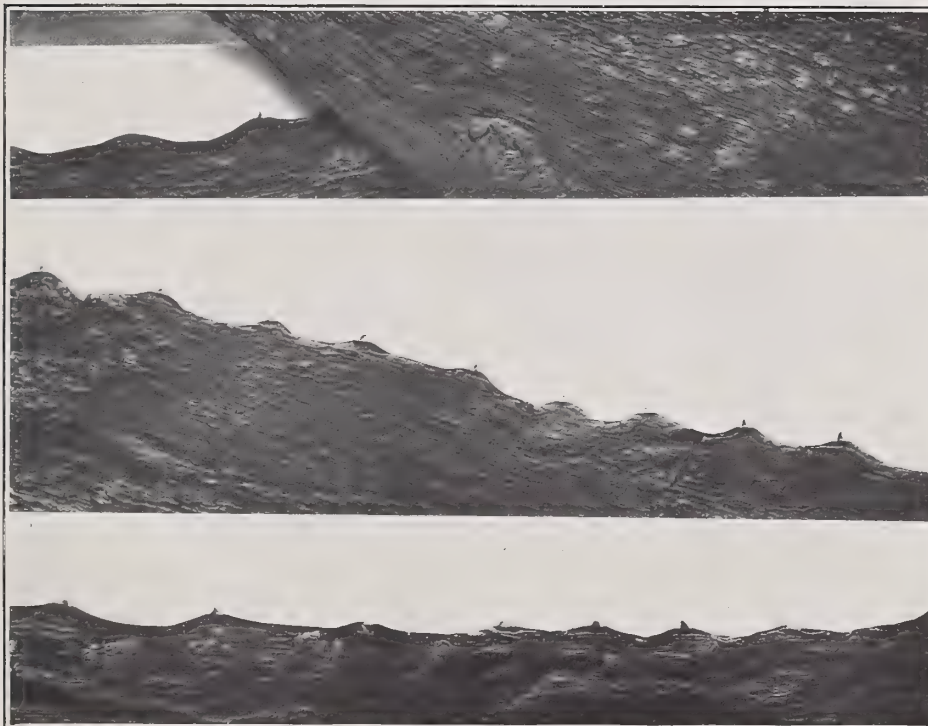
(The Cockpit "Coratoe" of Jamaica.)

Figure 1. Two leaf-tips and a marginal fragment showing the slender conical spine narrowly grooved below the middle, and the small triangular gently curved prickles a little widened into the tops of very low prominences of the margin. Fresh material (*Harris*). Natural size.

Figure 2. Three fragments of leaf-margins with the prickle-bearing prominences more marked. Herbarium material (*Harris*). Natural size.



1.



2

AGAVE HARRISII.

PLATE 51.

AGAVE HARRISII (p. 34).

[Plate 50 also.]

Figure 1. Several flowers, one of them opened, showing the shallow tube with the short filaments inserted at the rim of its rather flat floor and the erect segments indrawn at base. From material preserved in fluid (*Harris*). Natural size.

Figure 2. Four capsules showing their rather narrowly oblong form, gradual narrowing at base, and apical beak; and sixteen representative seeds. From dried material (*Harris*). Natural size.



1.



2.

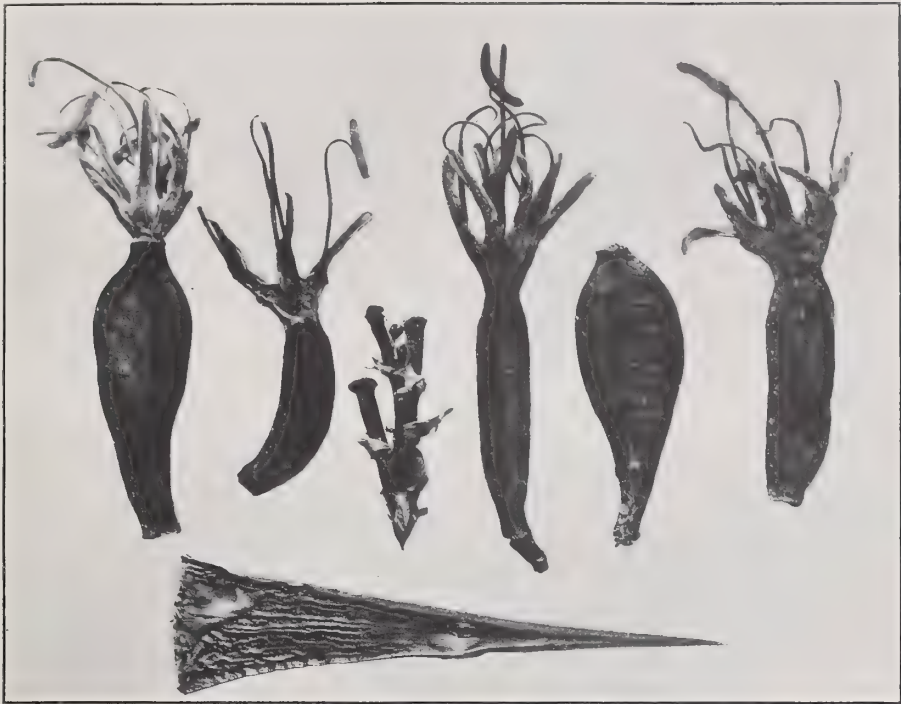
AGAVE HARRISII.

PLATE 52.

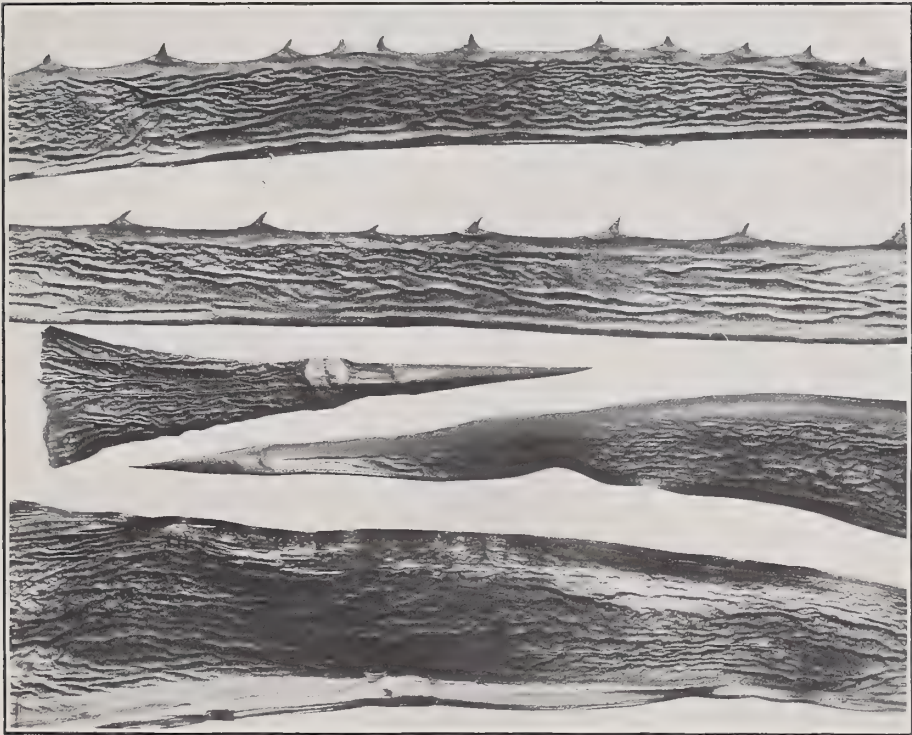
AGAVE ACICULARIS (p. 34).

Figure 1. A cluster of pedicels and several old flowers, one of them in section, and a partly developed capsule, showing the short pedicels, open tube, and short filaments inserted nearly in its throat. From herbarium material (Cuba, *Britton, Earle, and Wilson, 5926*). Natural size.

Figure 2. Two leaf-tips, two leaf-margins, and tip and lower portion of a (toothless) bract, showing the needle-shaped openly grooved spine and small triangular prickles lenticularly widened into the margin. From herbarium material (Cuba, *Britton, Earle, and Wilson, 5926*). Natural size.



1.



2.

AGAVE ACICULARIS.

PLATE 53.

AGAVE ALBESCENS (p. 44).

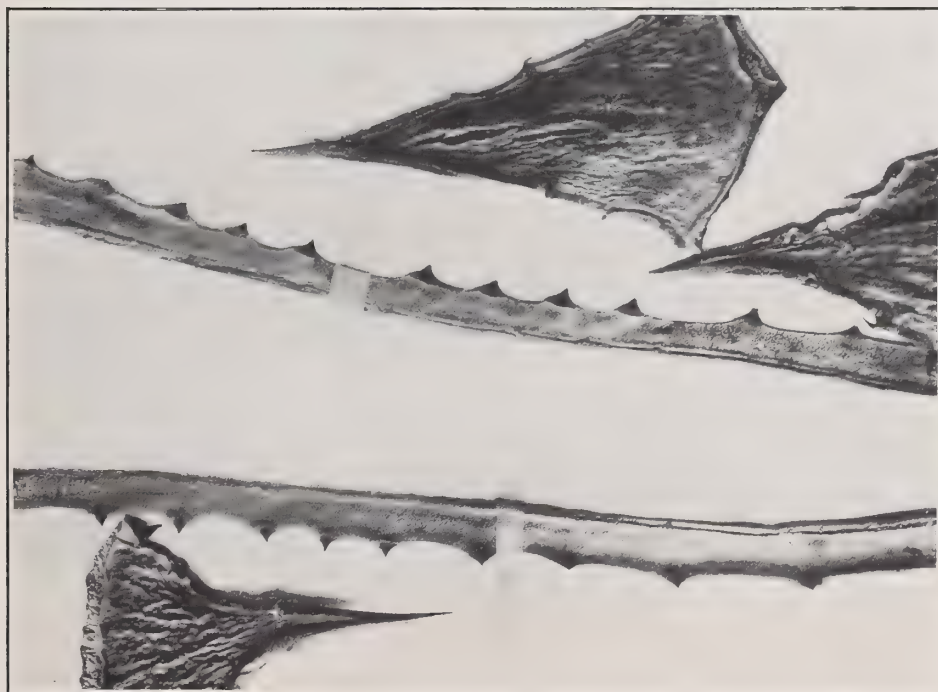
[Plate 116 also.]

Figure 1. A young plant of the type collection, cultivated at the Missouri Botanical Garden. Greatly reduced.

Figure 2. Three leaf-tips showing the short at length very broad-based openly grooved spine, roughened in two of the specimens; and parts of the leaf-margin at about the middle showing the small triangular prickles rather abruptly widening into the tops of low marginal prominences that finally become hard. Herbarium material (*Britton, 2085*). Natural size.



1.



2

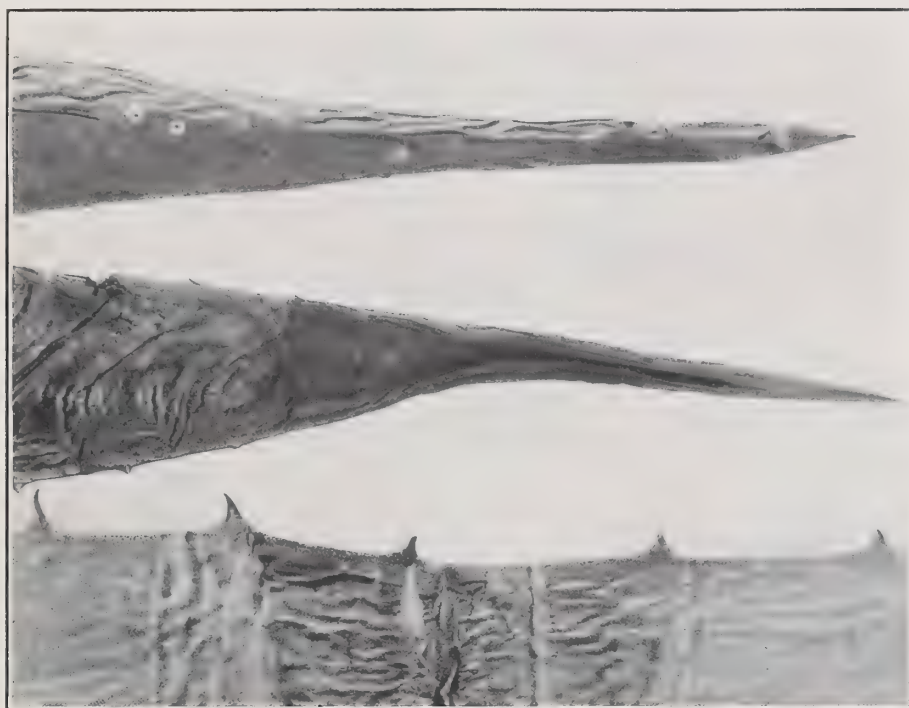
AGAVE ALDESCENS.

PLATE 54.

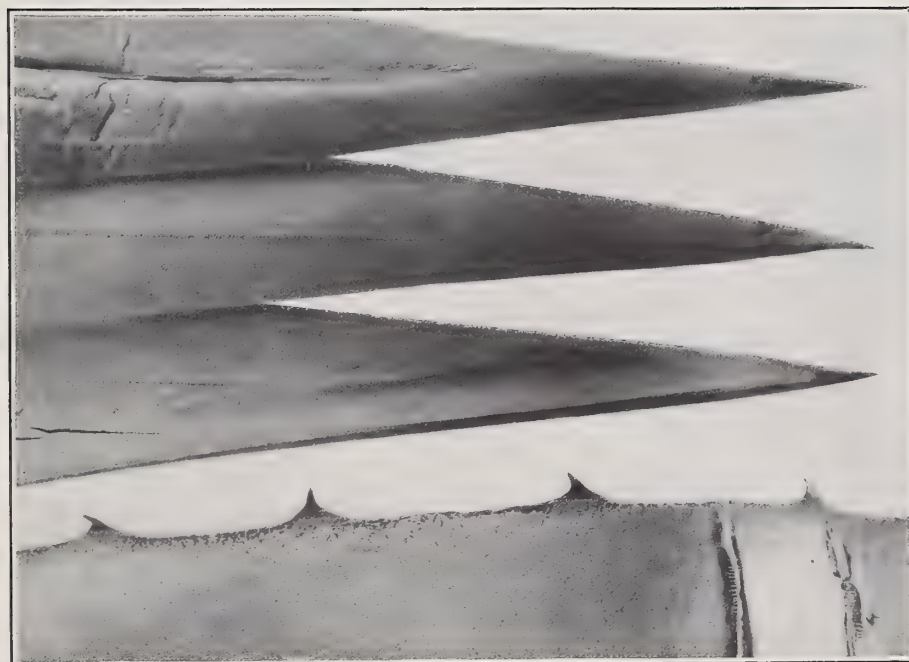
AGAVE GRISEA (p. 34).

[Plate 55 also.]

Figures 1 and 2. Leaf-tips and margins showing the short conical spine flat-grooved or involutely slit toward the base, and the heavily triangular rather large prickles on very low at length hardened marginal prominences. Herbarium material (Cuba, *Grey, 1*). Natural size.



1



2.

AGAVE GRISEA.

PLATE 55.

AGAVE GRISEA (p. 34).

[Plate 54 also.]

Figure 1. Fragments of inflorescence showing the rather short pedicels and short tube with the moderately long filaments inserted nearly in its throat. The flowers have already passed, so that the ovaries are enlarging. Herbarium material (Cuba, *Grey, 1*). Natural size.

Figure 2. Rather broad capsules with stipitate contraction and apical beak, and representative seeds. Herbarium material (Cuba, *Grey, 1*). Natural size.



1.



2.

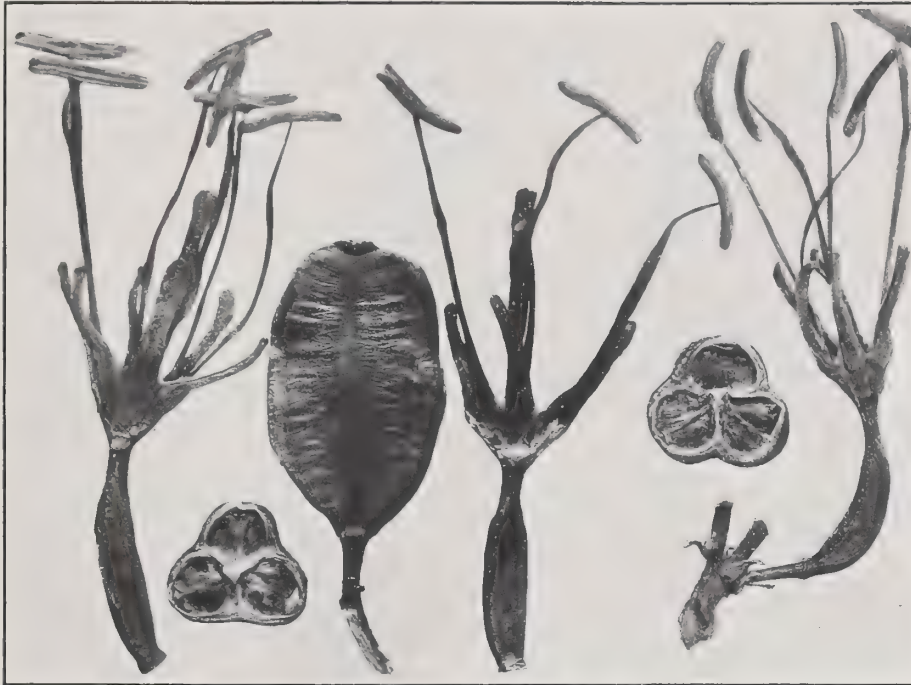
AGAVE GRISEA.

PLATE 56.

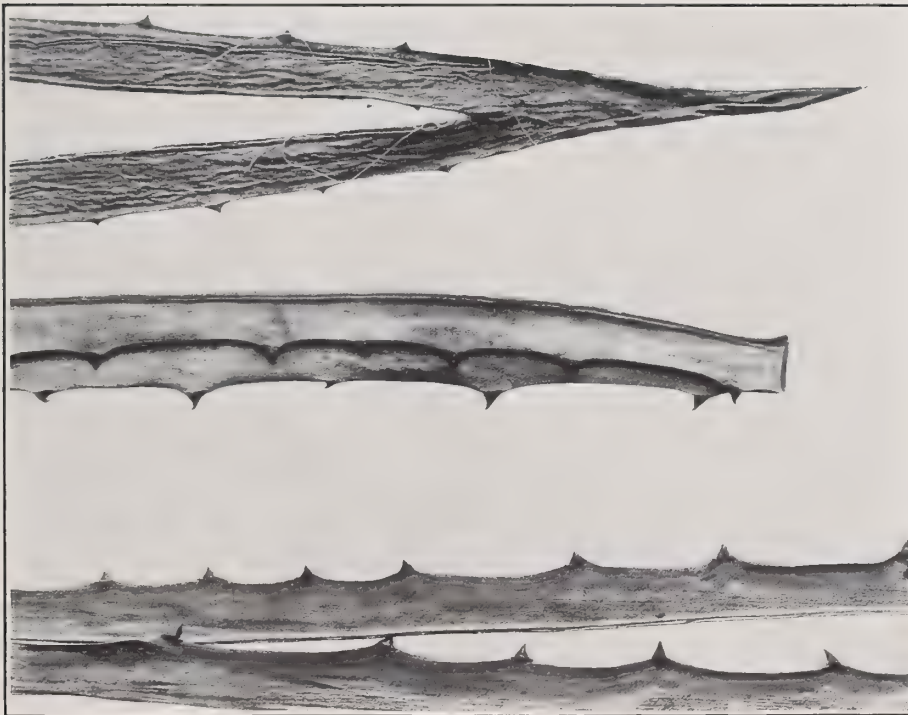
AGAVE GRISEA CIENFUEGOSANA (p. 35).

Figure 1. Flowers, one of them in section, and young capsules, two of them in section. From herbarium material (Cuba, *Britton, Earle, and Wilson, 4590*). Natural size.

Figure 2. A leaf-tip and parts of the margin showing the slender conical round-grooved spine and rather small acuminate-pointed prickles from very low marginal prominences. From herbarium material (Cuba, *Britton, Earle, and Wilson, 4590*). Natural size.



1.



2.

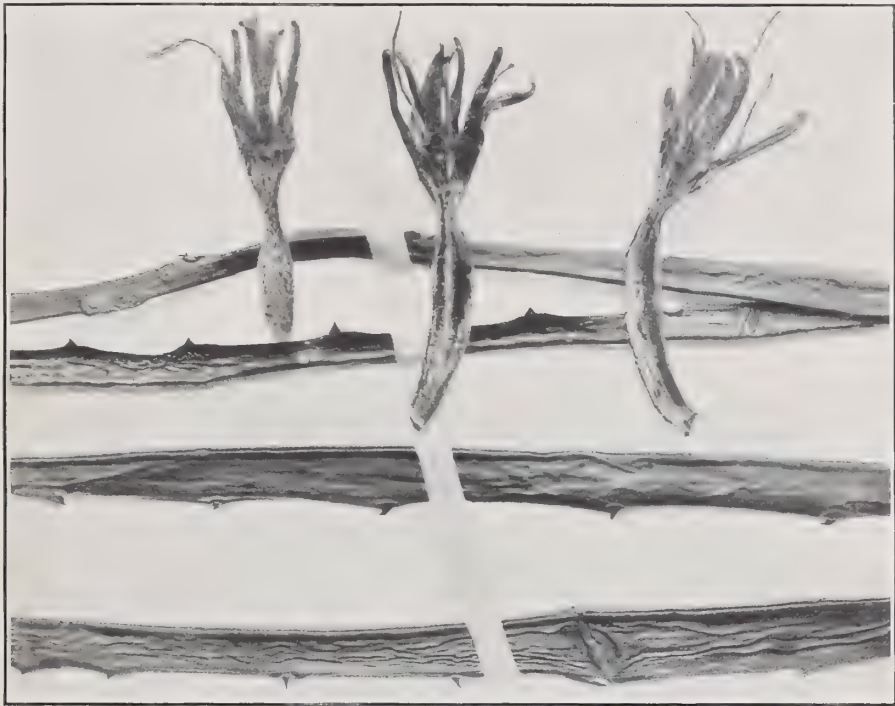
AGAVE GRISEA CIENFUEGOSANA.

PLATE 57.

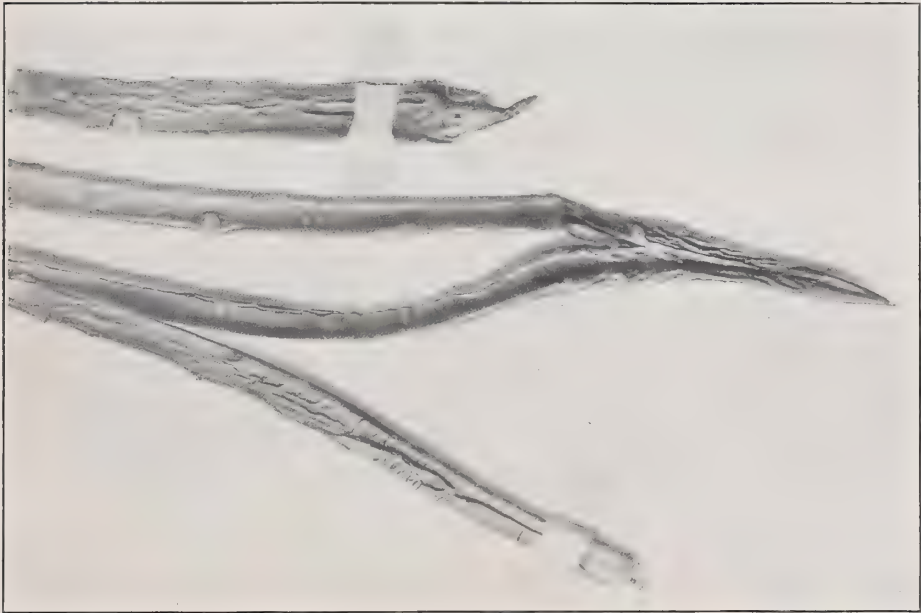
AGAVE SHAFERI (p. 35).

Figure 1. Leaf-tip and margins. From herbarium material (Cuba, *Shafer*, 3800).

Figure 2. Three small flowers of the more prickly form, in which the spine is shorter, somewhat recurved, and less round-grooved, with small somewhat lenticular-based prickles. From herbarium material (Cuba, *Shafer*, 3800). These specimens may represent a species distinct from those in figure 1.



1.



2.

AGAVE SHAFERI.

PLATE 58.

AGAVE LEGRELLIANA (p. 35).

[Plates 59-62 also.]

An unusually broad-leaved plant showing the characteristic curvature of the acuminate leaves and their toothed up to the tip. Photographed at Cojimar, Cuba, by the author. About one-twentieth natural size.



AGAVE LEGRELLIANA.

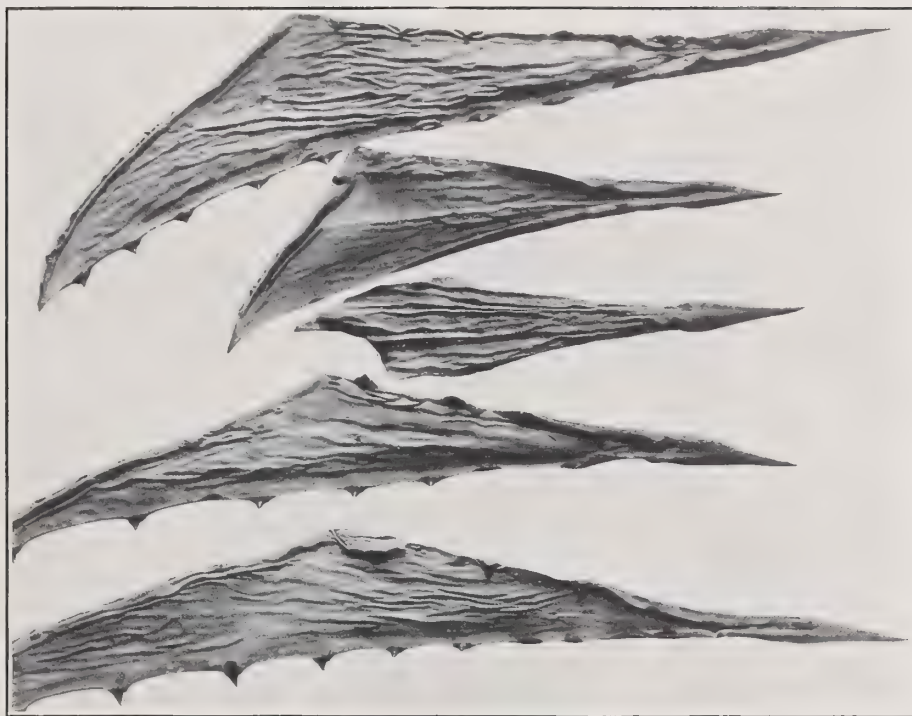
PLATE 59.

AGAVE LEGRELLIANA (p. 35).

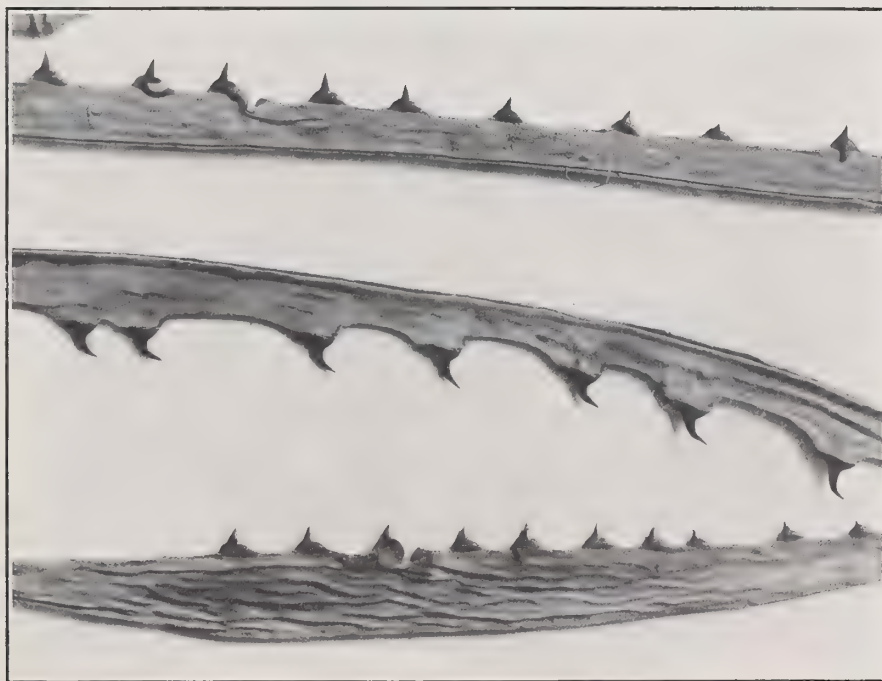
[Plates 58 and 60-62 also.]

Figure 1. Five leaf-tips showing the slightly curved rather awl-shaped spine, round-grooved below the middle. From herbarium material (Cuba, *Trelease*). Natural size.

Figure 2. Three parts of a leaf margin showing the variously lengthened and curved triangular prickles from half-round bases representing what were at first small green prominences of the margin, or surmounting the latter when larger. From herbarium material (Cuba, *Trelease*). Natural size.



1.



2.

AGAVE LEGRELLIANA.

PLATE 60.

AGAVE LEGRELLIANA (p. 35)

[Plates 58, 59, 61, and 62 also.]

A representative plant beginning to flower, showing the very broad panicle occupying all of the scape above the leaf-tips, and its long slender branches openly branched at tip and recurved by the weight of the flowers. Photographed at Cojimar, Cuba, by the author. About one-seventieth natural size.



AGAVE LEGRELLIANA.

PLATE 61.

AGAVE LEGRELLIANA (p. 35).

[Plates 58-60 and 62 also.]

A cluster of four flowers from the plant figured in plate 60, showing the long pedicels and large flowers with the ovary stipitately narrowed or constricted at base, deep tube, and long filaments. Fresh material. Natural size.



AGAVE LEGRELLIANA.

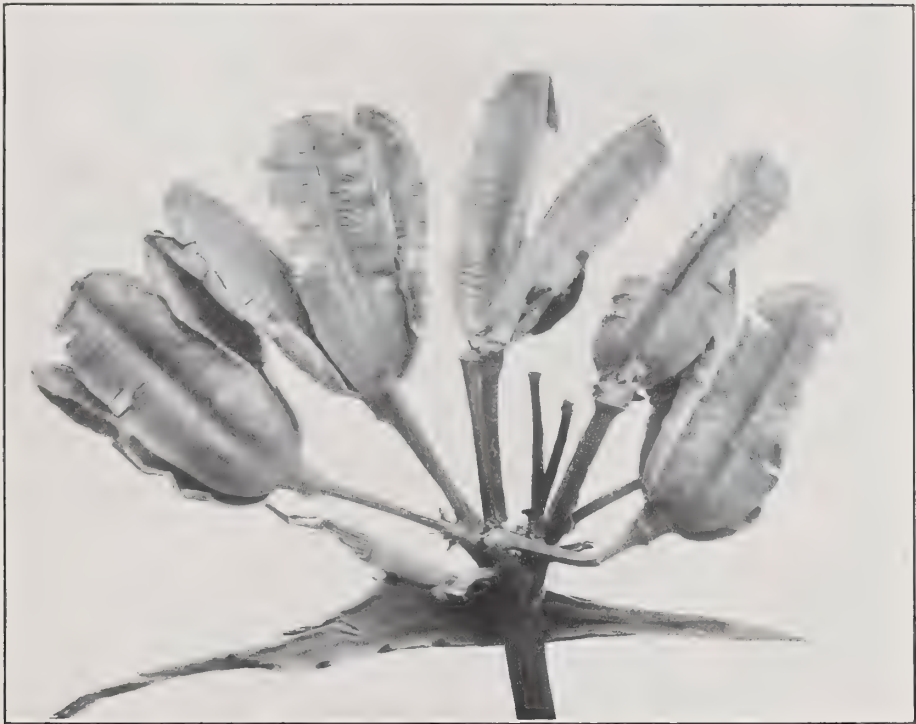
PLATE 62.

AGAVE LEGRELLIANA (p. 35).

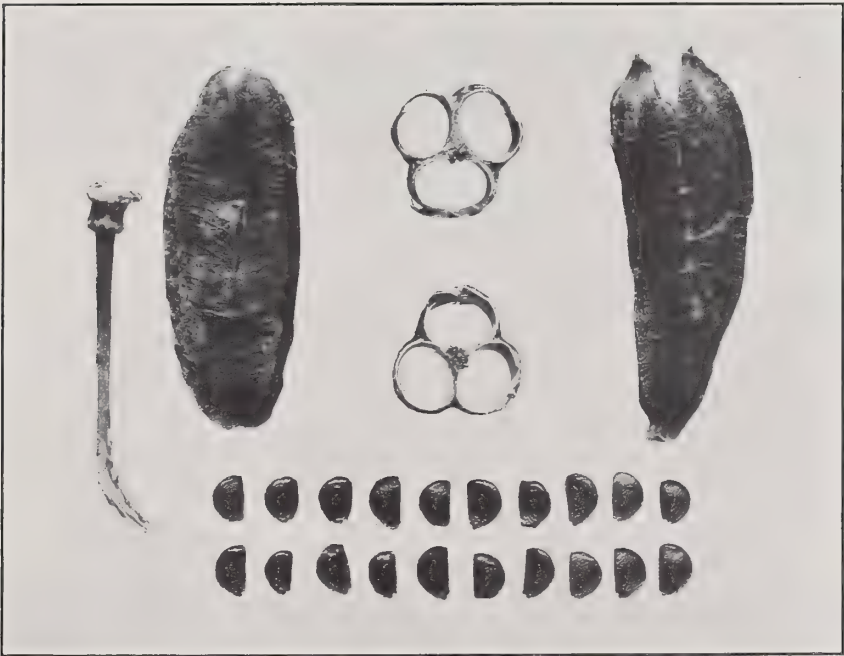
[Plates 58-61 also.]

Figure 1. A cluster of old fruits, showing the long pedicels, strongly stipitate oblong capsules; and a leaf-tip with more flatly grooved spine than usual. From dried material (Cuba, *Shafer*, 2770). Natural size.

Figure 2. A pedicel, two undersized capsules, two capsules in section, and twenty representative seeds. From dried material (Cuba, *Britton, Earle, and Wilson*, 6217). Natural size.



1.



2.

AGAVE LEGRELLIANA.

PLATE 63.

AGAVE LONGIPES (p. 36).

(The Blue Mountain "Coratoe" of Jamaica.)

Figure 1. A cluster of buds and flowers showing the long pedicels, rather deep tube, and elongated filaments. From herbarium material (*Maxon, 1624*). Natural size.

Figure 2. Four leaf-tips showing the range of spine form from slenderly conical and narrowly grooved to broad-based and very openly and shallowly grooved; and a leaf-margin from about the middle showing the slender curved prickles, surmounting very low marginal elevations. From fresh material (*Harris*). Natural size.



1.



2.

AGAVE LONGICEPS.

PLATE 64.

AGAVE INTERMIXTA (p. 32).

[Plate 65 also.]

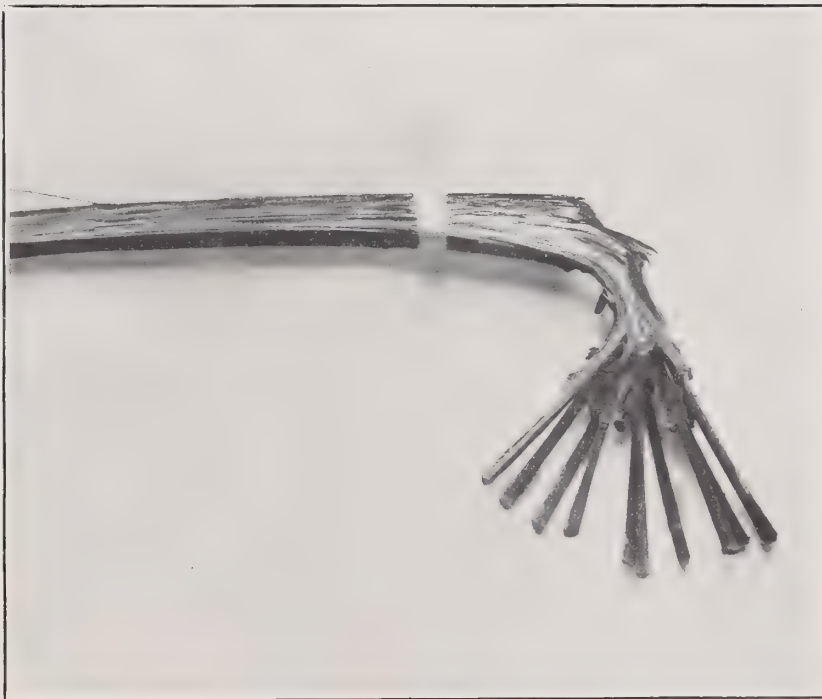
Figure 1. Two flowers showing the long fusiform ovary, deep tube, and rather short filaments.

Figure 2. Fragment of a panicle branch showing the long pedicels.

The specimens represented by figures 1 and 2 are from herbarium material (Santo Domingo, Parry, Wright, and Brummel, 1871, intermixed with *Agave antillarum*,—pl. 43). Natural size.



1.



2.

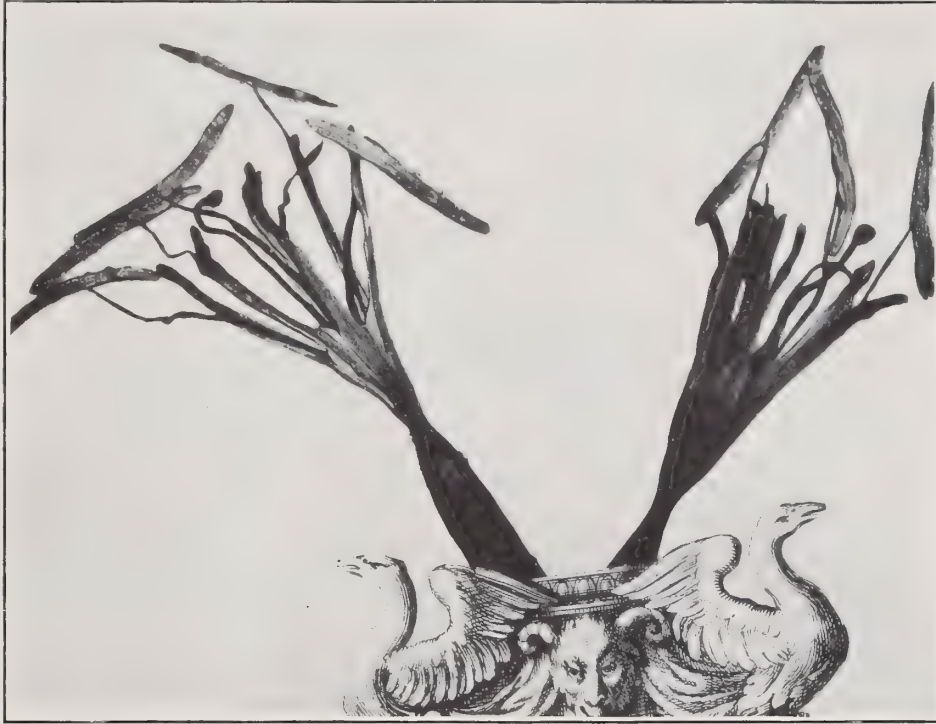
AGAVE INTERMIXTA.

PLATE 65.

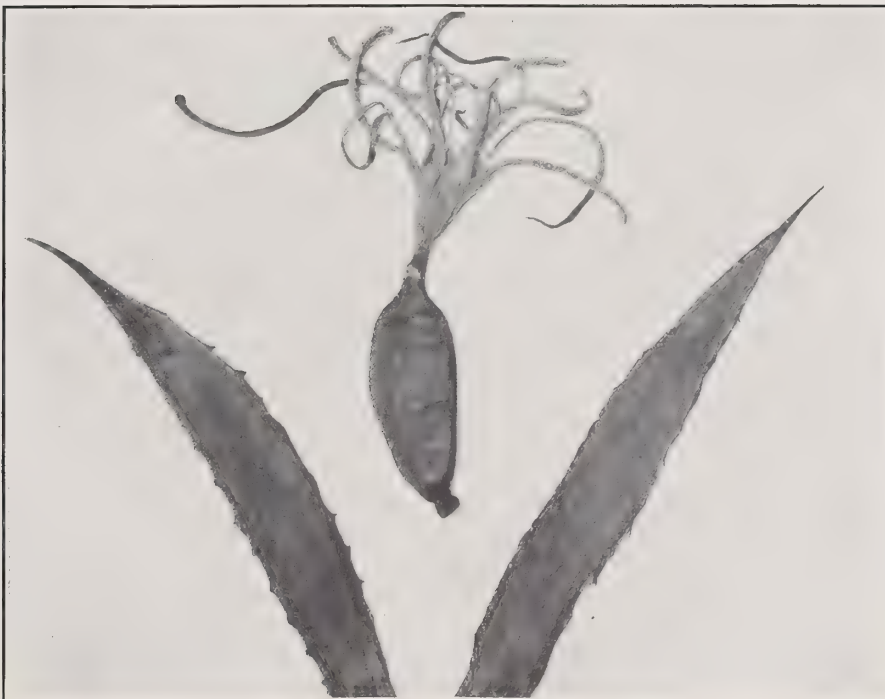
Figure 1. "Aloes Americanae muricatae flores. 5" = *Agave barbadensis?*

Figure 2. Flowers and the ends of young leaves of "Aloe yuccae foliis" etc., collected in the Chelsea Garden = *Agave intermixta?*

Both figures are from specimens in the herbarium of the Natural History Museum at South Kensington, photographed by permission, and of natural size. They represent two early collections of flowers apparently of West Indian species.



1. AGAVE BARBADENSIS?



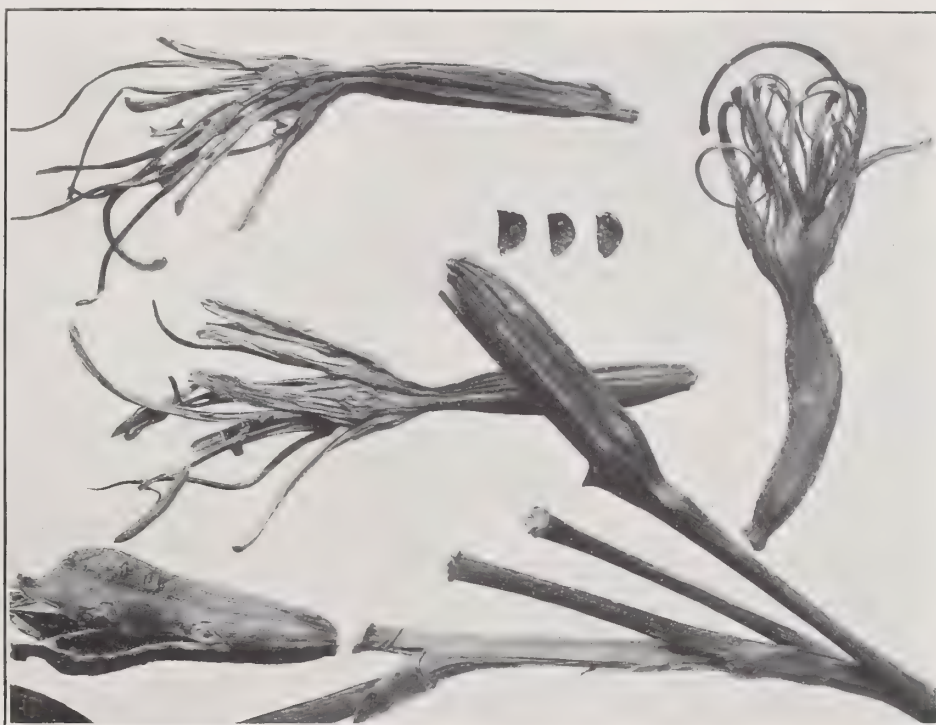
2. AGAVE INTERMIXTA?

PLATE 66.

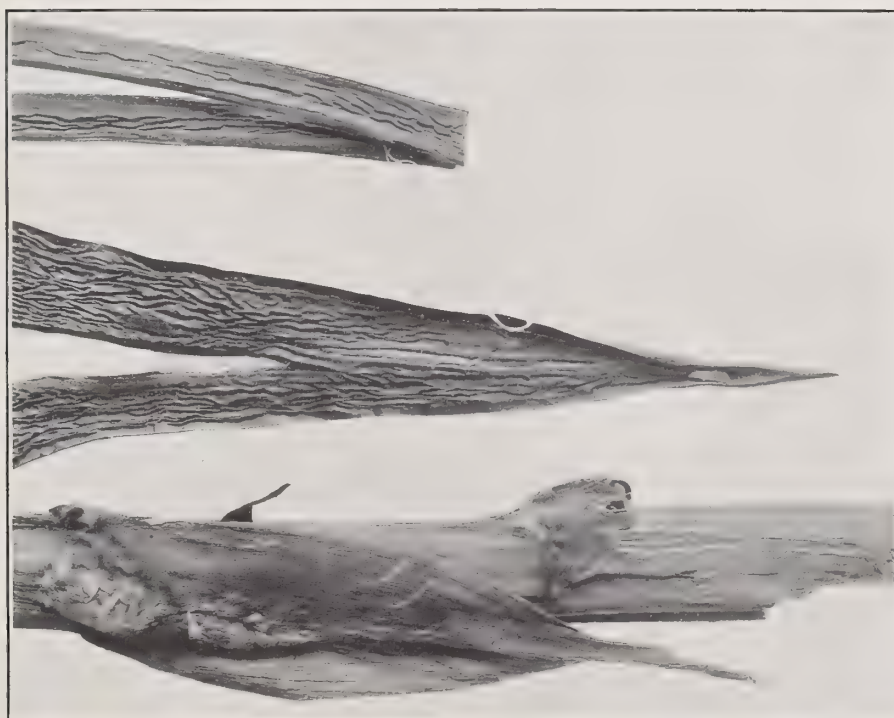
AGAVE ANOMALA (p. 36).

Figure 1. Three flowers, a fragment of an abnormal inflorescence, two imperfectly developed capsules, and three seeds. From herbarium material (Cuba, *Shafer*, 1409). Natural size.

Figure 2. A fragment of the same inflorescence and a leaf-tip and part of the margin showing the conical round-grooved spine and the absence of prickles. From herbarium material (Cuba, *Shafer*, 1409). Natural size.



1.



2.

AGAVE ANOMALA.

PLATE 67.

AGAVE UNDERWOODII (p. 37).

[Plates B and 68-71 also.]

Figure 1. A representative mature plant.

Figure 2. A very broad-leaved young plant showing extreme differences in shape and direction of the leaves.

Both specimens were photographed about the harbor of Santiago de Cuba by the author. Greatly, but unequally, reduced.



1.



2.

AGAVE UNDERWOODII.

PLATE 68.

AGAVE UNDERWOODII (p. 37).

[Plates B, 67, and 69-71 also.]

Representative flowering specimens showing the ample low-branched panicles with their slender ascending branches recurved by the weight of the flowers. Photographed about the harbor of Santiago de Cuba by the author. About one-sixtieth natural size.



AGAVE UNDERWOODII.

PLATE 69.

AGAVE UNDERWOODII (p. 37).

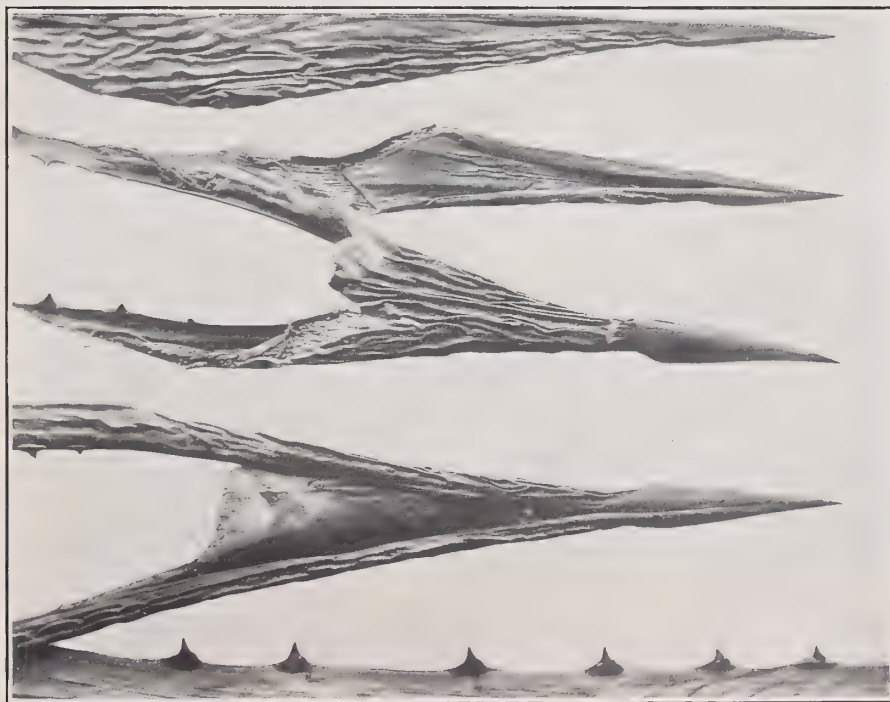
[Plates B, 67, 68, 70, and 71 also.]

Figure 1. Three flowers, split longitudinally and two of them seen from within, showing the long pedicels, slender ovary, moderately shallow tube, and elongated filaments inserted nearly in the throat. From herbarium material (Cuba, *Trelease, 3*). Natural size.

Figure 2. Four leaf-tips and a margin at about the middle, showing the conical involutely slit spine and slender prickles from rounded bases somewhat widened into the margin. From herbarium material (Cuba, *Trelease, 3*). Natural size.



1.



2.

AGAVE UNDERWOODII.

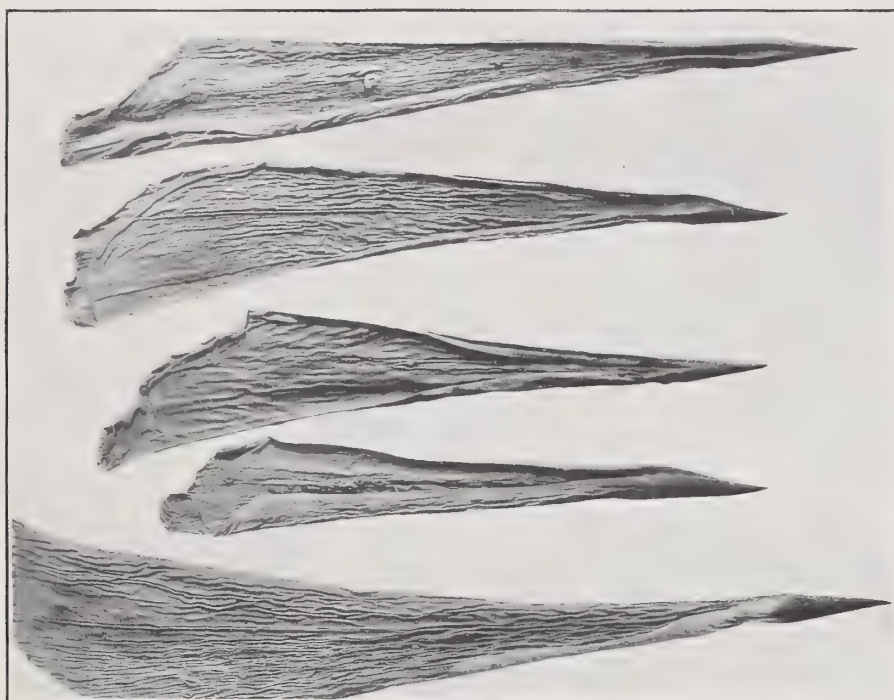
PLATE 70.

AGAVE UNDERWOODII (p. 37).

[Plates B, 67-69, and 71 also.]

Figure 1. Five leaf-tips. From herbarium material (Cuba, *Trelease, 2*).

Figure 2. Part of a margin at about the middle showing more openly grooved spines and more lenticularly widened prickles. From herbarium material (Cuba, *Trelease, 2*).



1.



2.

AGAVE UNDERWOODII.

PLATE 71.

AGAVE UNDERWOODII (p. 37).

[Plates B and 67-70 also.]

Figure 1. Fragments of a fresh inflorescence showing the elongated pedicels and plicated tube. (Cuba, *Trelease, 2.*)

Figure 2. Fragment of a dried fruit cluster showing the narrowly oblong short-stipitate capsules; and twelve representative seeds. (Cuba, *Trelease, 2.*)



1.



2.

AGAVE UNDERWOODII.

PLATE 72.

AGAVE MISSIONUM (p. 37).

(The "Karatá" of St. Thomas and the Virgin Islands.)

[Plates B and 73-75 also.]

A representative plant showing the characteristic form and curvature of the leaves. Photographed at Ma Folie, St. Thomas, by the author. About one-twentieth natural size.



AGAVE MISSIONUM.

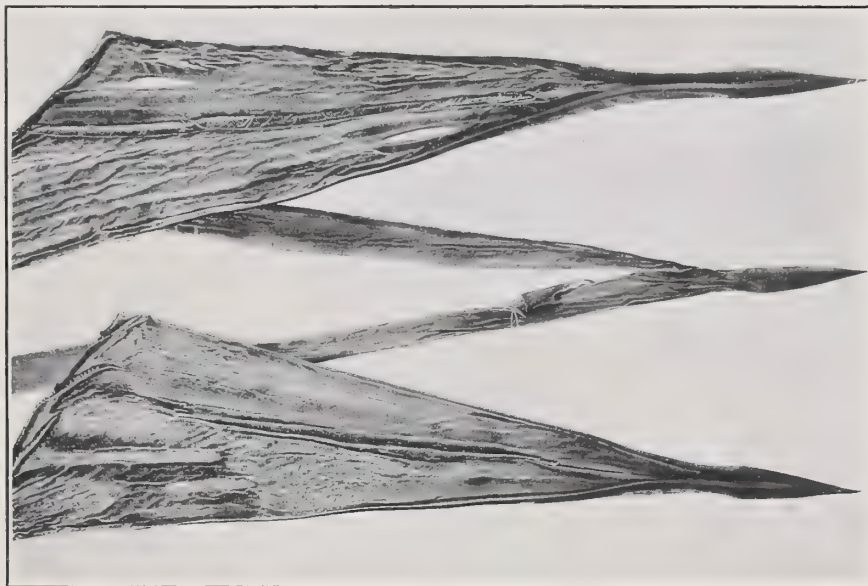
PLATE 73.

AGAVE MISSIONUM (p. 37).

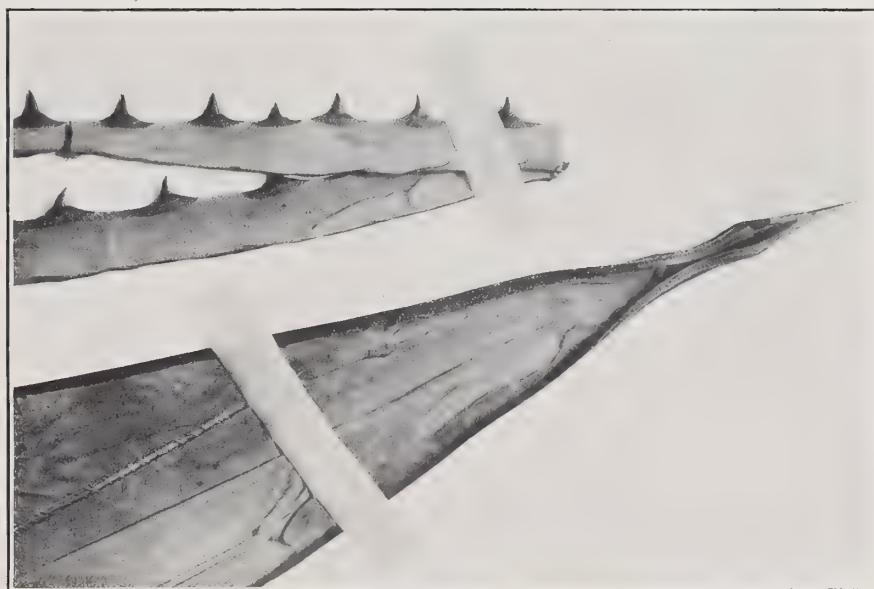
[Plates B, 72, 74, and 75 also.]

Figure 1. Three leaf-tips showing the awl-pointed openly grooved spine. From herbarium material (St. Thomas, *Trelease*).

Figure 2. Leaf-tip and fragment of a leaf-margin at about the middle, showing the rather heavily triangular prickles, lenticularly widened into the margin. From herbarium material (St. Thomas, *Trelease*).



1.



2.

AGAVE MISSIONUM.

PLATE 74.

AGAVE MISSIONUM (p. 37).

[Plates B, 72, 73, and 75 also.]

An old fruiting plant of the preceding season, showing the rather narrow panicle with ascending branches. Photographed at Krumbay, St. Thomas, by the author. About one-fiftieth natural size.



AGAVE MISSIONUM.

PLATE 75.

AGAVE MISSIONUM (p. 37).

[Plates B and 72-74 also.]

Figure 1. Pedicels and flowers, one of them opened, showing the long pedicels, moderately deep tube, and elongated filaments inserted in its throat. From herbarium material (St. Thomas, *Emanuel*). Natural size.

Figure 2. Two old capsules showing their elongated pedicels, prominent stipe, and apical beak, from the plant pictured on plate 74; and two fresh capsules and eighteen seeds (St. Thomas, *Emanuel*). Natural size.



1.



2.

AGAVE MISSIONUM.

PLATE 76.

AGAVE PORTORICENSIS (p. 38).

(The "Cocuiza" of Southern Puerto Rico.)

[Plates B and 77-82 also.]

Figures 1 and 2. Two plants showing differences in proportion, plication, and direction of the leaves. Photographed between Coamo and Aibonito, Puerto Rico, by the author. Greatly, and unequally, reduced.



1.



2.

AGAVE PORTORICENSIS.

PLATE 77.

AGAVE PORTORICENSIS (p. 38).

[Plates B, 76, and 78-82 also.]

Parts of two panicles, figure 1 in flower, figure 2 in fruit, showing their narrowness and the nearly horizontal short branches. Photographed near Coamo Springs, Puerto Rico, by Mr. L. H. Dewey. Greatly reduced.



1.



2.

AGAVE PORTORICENSIS.

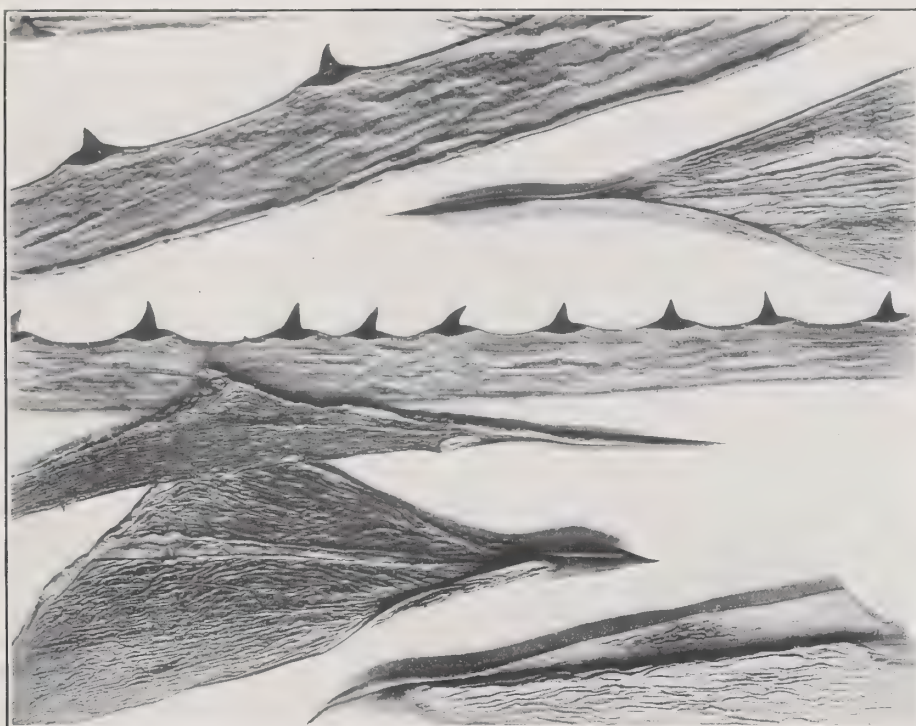
PLATE 78.

AGAVE PORTORICENSIS (p. 38).

[Plates B, 76, 77, and 79-82 also.]

Figure 1. Leaf-tips and margin, showing variation in the narrowly grooved spine and the rather heavily triangular prickles from lens-shaped bases at top of marginal prominences. From herbarium material (Puerto Rico, *Trelease*).

Figure 2. The end of a panicle branch showing the rather long pedicels and nearly round strongly stipitate capsules. From herbarium material (Puerto Rico, *Underwood and Griggs*, 587).



1.



2.

AGAVE PORTORICENSIS.

PLATE 79.

AGAVE PORTORICENSIS (p. 38).

[Plates B, 76-78, and 80-82 also.]

Two plants from the western part of Puerto Rico showing characteristic foliage; figure 1, wild, at Sabana Grande; figure 2, cultivated, at the Mayaguez Experiment Station. Photographed by the author. Greatly, and unequally, reduced.



1.



2.

AGAVE PORTORICENSIS.

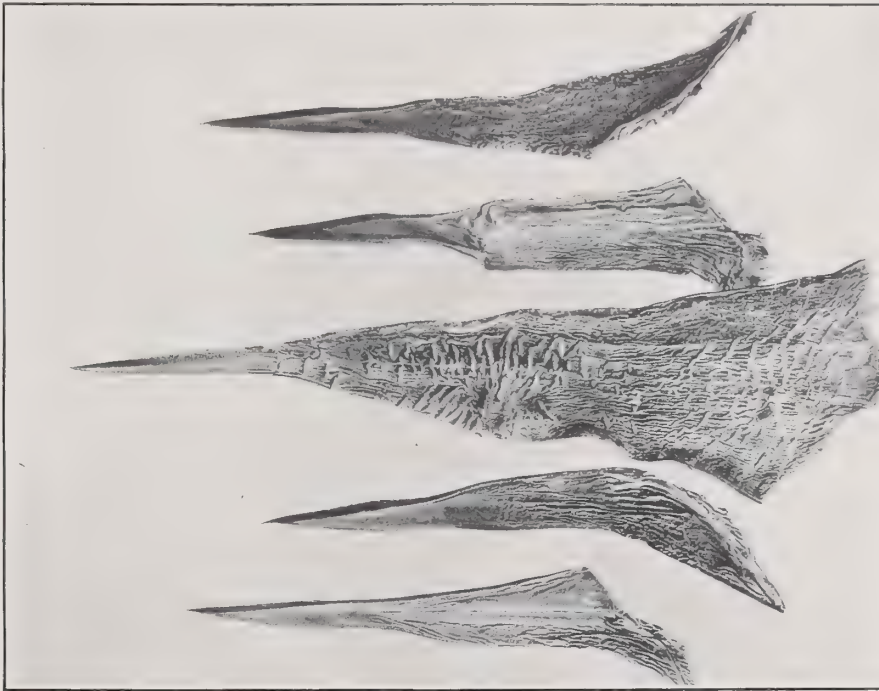
PLATE 80.

AGAVE PORTORICENSIS (p. 38).

[Plates B, 76-79, 81, and 82 also.]

Figure 1. Five leaf tips showing openly grooved spines. From herbarium material collected at Sabana Grande, western part of Puerto Rico. Natural size.

Figure 2. Leaf tip and margin showing large lenticular-based prickles. From herbarium material collected at Sabana Grande, western part of Puerto Rico. Natural size.



1.



2.

AGAVE PORTORICENSIS.

PLATE 81.

AGAVE PORTORICENSIS (p. 38).

[Plates B, 76-80, and 82 also.]

The western form, preparing to flower. Photographed at Sabana Grande by the author.
About one-fiftieth natural size.



AGAVE PORTORICENSIS.

PLATE 82.

AGAVE PORTORICENSIS (p. 38).

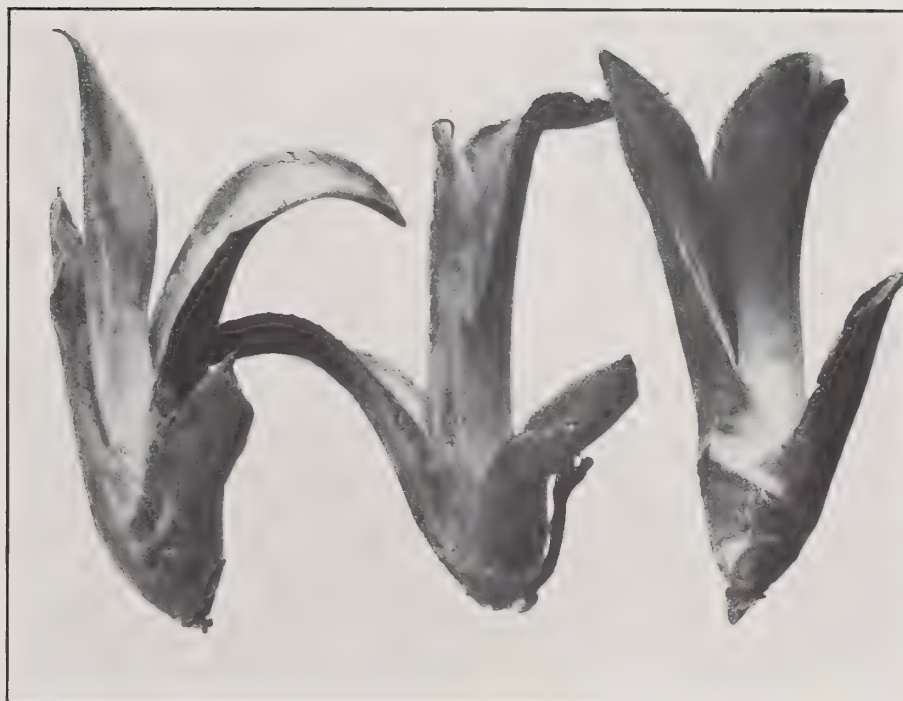
[Plates B and 76-81 also.]

Figure 1. An old capsule from Sabana Grande (*Trelease*). Natural size.

Figure 2. Bulbils from a plant cultivated from Sabana Grande at Mayaguez. (*Henricksen*). Natural size.



1.



2.

AGAVE PORTORICENSIS.

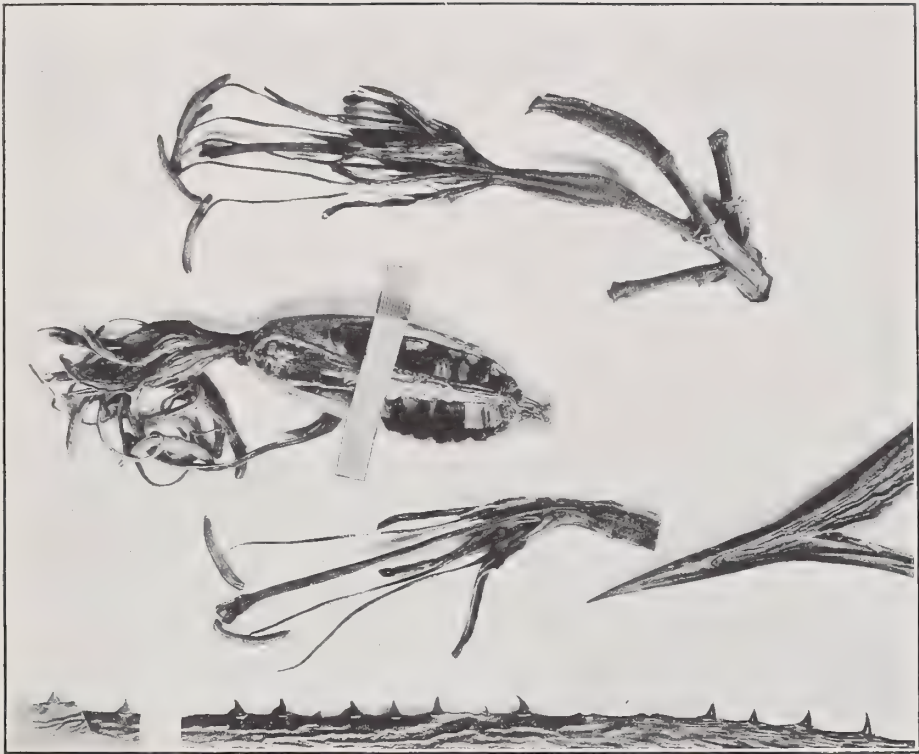
PLATE 83.

AGAVE BRACEANA (p. 40).

(The "Manilla" of the northern Bahamas.)

Figure 1. Leaf-tip and margin showing the slightly curved stout conical spine grooved to the middle, and gently curved small triangular prickles not widened at base; and rather small flowers with elongated filaments. From herbarium material (Great Bahama, *Britton and Millspaugh*, 2467). Natural size.

Figure 2. A panicle fragment with old capsules showing their moderately long pedicels, broad outline, and thick stipitate base. From herbarium material (Abaco, *Brace*, 1982). Natural size.



1.



2.

AGAVE BRACEANA.

PLATE 84.

AGAVE BAHAMANA (p. 40).

(The "Bamboo" of the north-central Bahamas.)

[Plates 85 and 86 also.]

Figure 1. A landscape containing two old inflorescences showing their long scape and short open panicle. Photographed on Eleuthera by Professor J. T. Rothrock. Very greatly reduced.

Figure 2. A representative plant showing the rather erect slightly plicate leaves out-curved in age or somewhat S-shaped. Photographed on Great Harbor Cay by Dr. C. F. Millspaugh. About one-fortieth natural size.



1.



2.

AGAVE BAHAMANA.

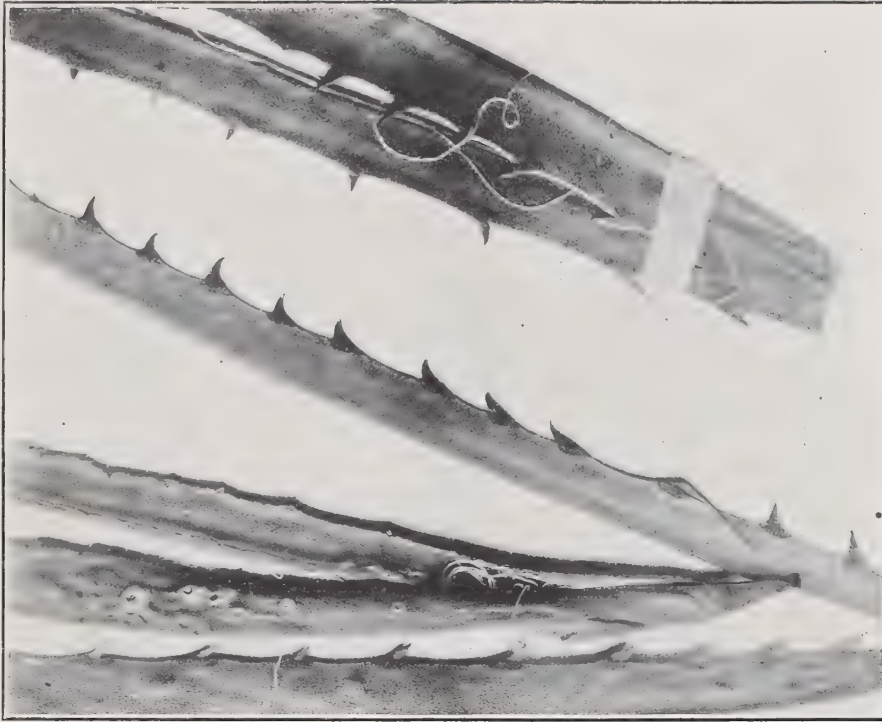
PLATE 85.

AGAVE BAHAMANA (p. 40).

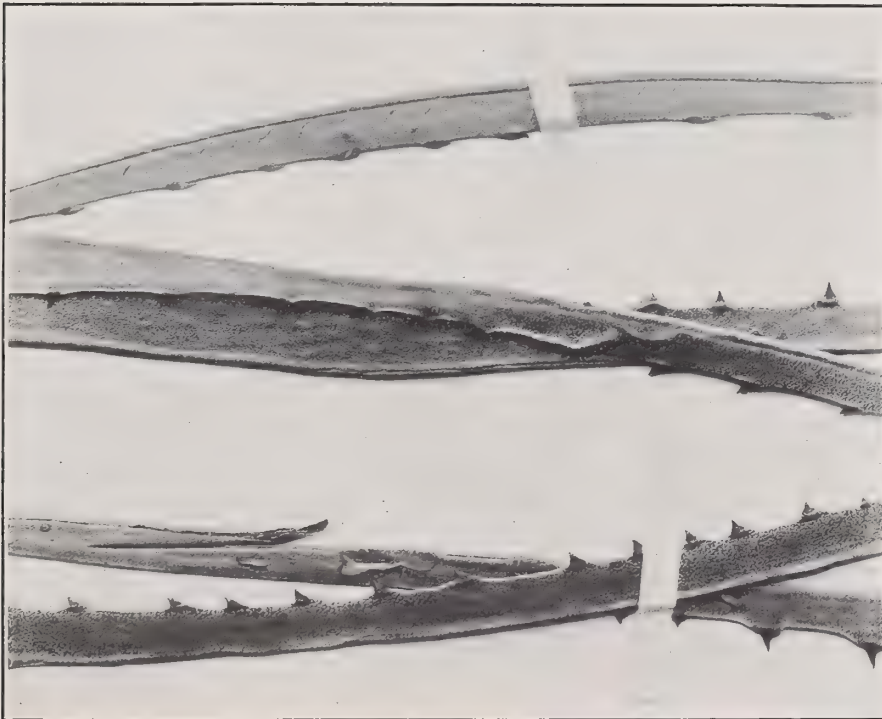
[Plates 84 and 86 also.]

Figures 1 and 2. Leaf-tip and margins showing the short stout involute spine, and rather heavily triangular straight, curved, or refracted prickles often from slight prominences and rarely hardened into the margin. From herbarium material, natural size.

Figure 1 is from Eleuthera material (*Britton and Millspaugh, 5381*), and figure 2 from Great Harbor Cay (*Britton and Millspaugh, 2340*).



1.



2.

AGAVE BAHAMANA.

PLATE 86.

AGAVE BAHAMANA (p. 40).

[Plates 84 and 85 also.]

Figure 1. Pedicels, two flowers, and half of an opened flower. From herbarium material (Great Harbor Cay, *Britton and Millspaugh*, 2340). Natural size.

Figure 2. Two capsules and eight seeds, showing the large size of the former and their short stout contracted base and distinct beak. From herbarium material (Eleuthera, *Hitchcock*). Natural size.



1.



2.

AGAVE BAHAMANA.

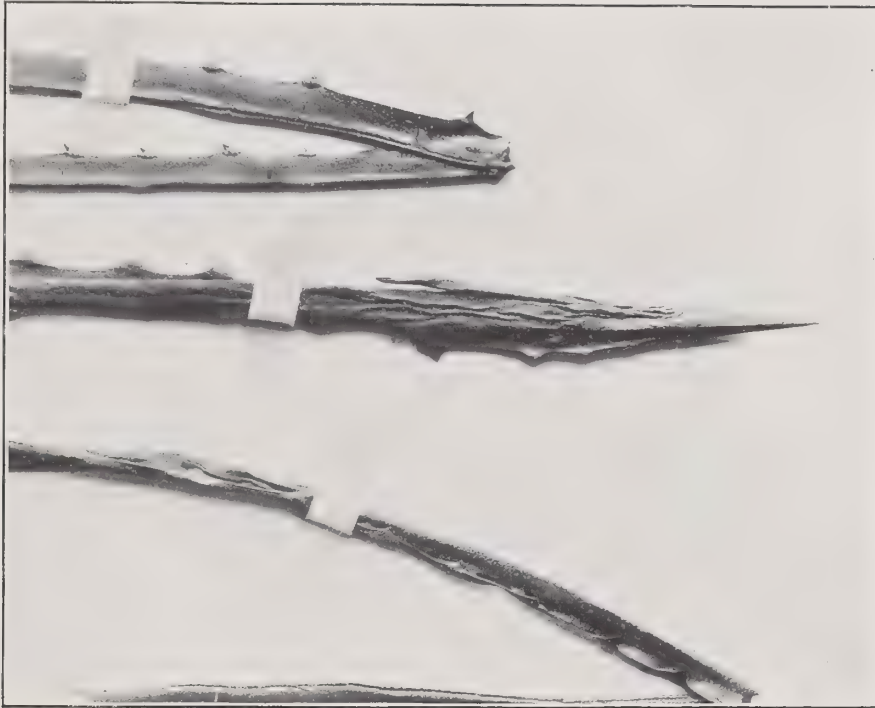
PLATE 87.

AGAVE MILLSAUGHII (p. 41).

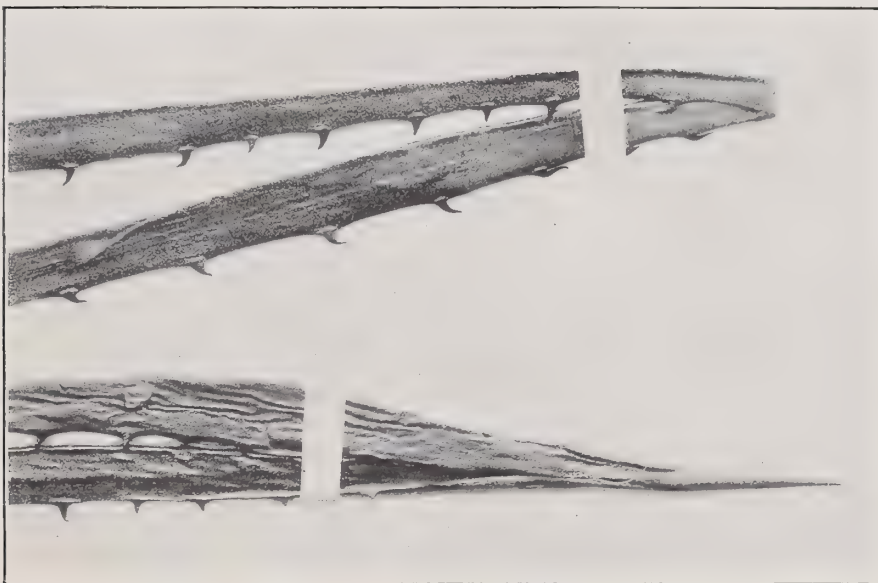
(The "Bamboo" of the south-central Bahamas.)

[Plate 88 also.]

Figures 1 and 2. Leaf-tips and margins showing the slender V-grooved spine and usually narrowly triangular straight or curved prickles not hardened into the margin. From herbarium material (Great Exuma, *Britton and Millspaugh*, 3091, 3038). Natural size.



1.



2.

PLATE 88.

AGAVE MILLSPAUGHII (p. 41).

[Plate 87 also.]

Figure 1. Several rough-dried flowers. From herbarium material (Great Exuma, *Britton and Millspaugh, 3091*). Natural size.

Figure 2. Three small capsules and eighteen seeds. From herbarium material (Great Exuma, *Britton and Millspaugh, 3091*). Natural size.



1



2.

AGAVE MILLSPAUGHII.

PLATE 89.

AGAVE CACOZELA (p. 41).

(The "Bamboo" of New Providence.)

[Plates B, 90, and 91 also.]

A fully developed plant in flower showing the strong scape with spreading triangular bracts, and the very densely flowered strong ascending branches of the stalked panicle. Photographed for Mr. L. J. K. Brace in the Colonial Hotel grounds at Nassau. About one-thirty-fifth natural size.



AGAVE CACOEZELA.

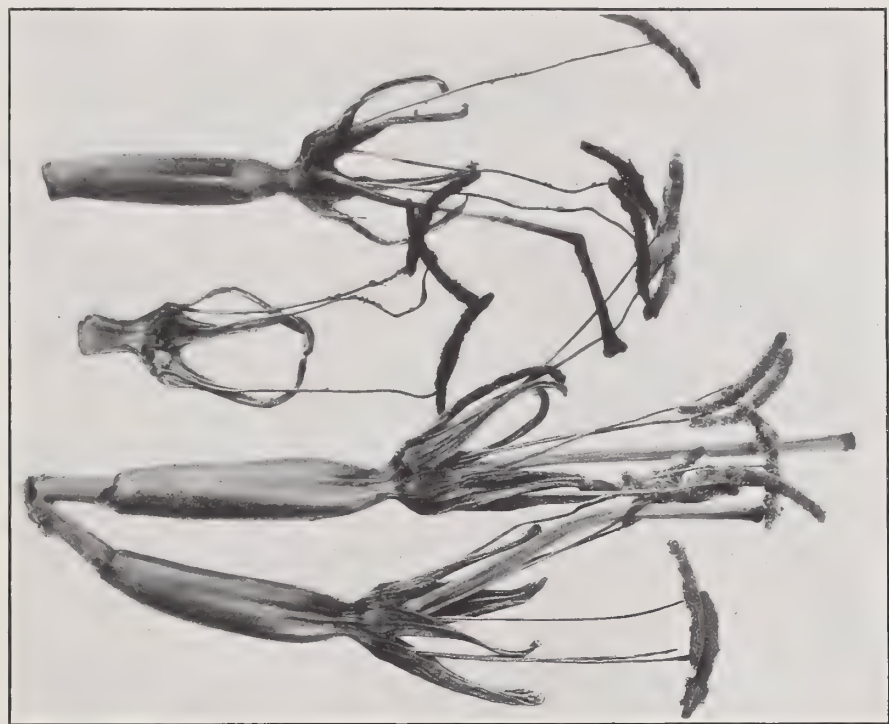
PLATE 90.

AGAVE CACUZELA (p. 41).

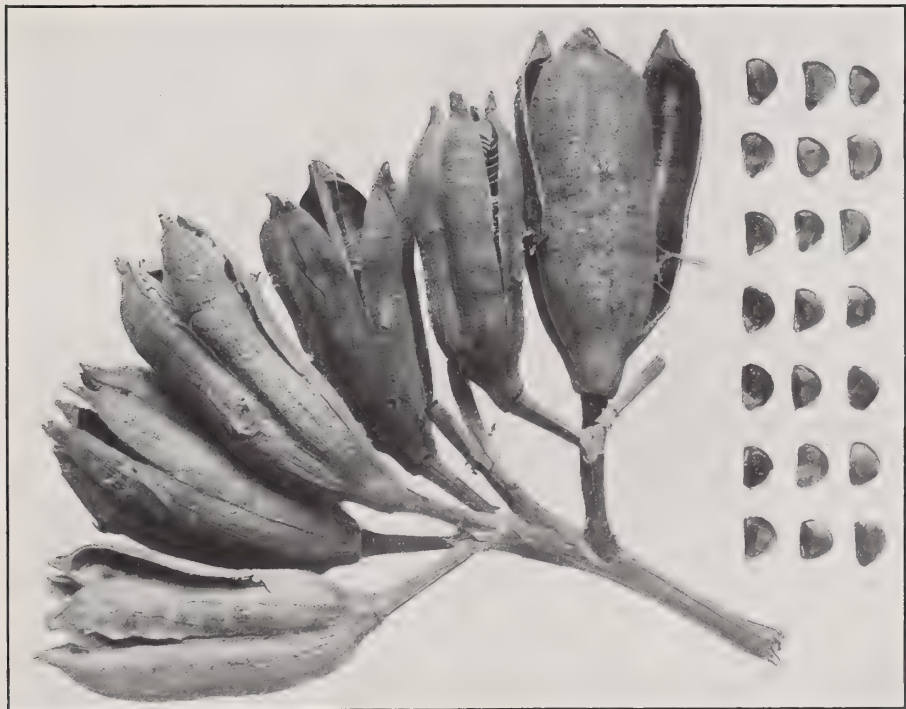
[Plates B, 89, and 91 also.]

Figure 1. Several somewhat withered flowers, one of them opened, showing the oblong ovary contracted at top and above the base, very open shallow tube and elongated filaments. From fresh material (*Brace*). Natural size.

Figure 2. A cluster of capsules showing their elongated form, gradual narrowing at base, and apical beak, and twenty-one representative seeds. From dried specimens (*Cunningham*). Natural size.



1.



2.

AGAVE CACOEZELA.

PLATE 91.

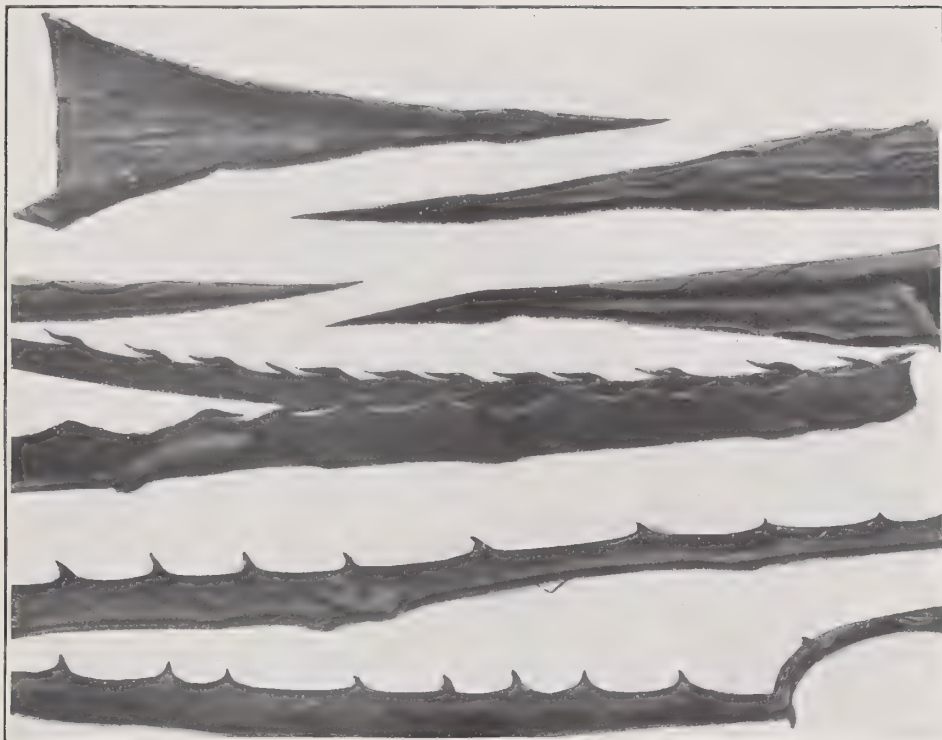
AGAVE CACOEZELA (p. 41).

[Plates B, 89, and 90 also.]

Figure 1. Four leaf-tips showing the narrowly conical round-grooved spine; and several parts of a leaf-margin showing the triangular prickles recurved or bent parallel to the margin into which they are little if at all hardened. From herbarium material (New Providence, *Brace*). Natural size.

AGAVE ACKLINICOLA (p. 41).

Figure 2. Three leaf-tips and parts of a leaf-margin showing the slenderly conical narrow-grooved spine and the small triangular straight or curved prickles on low elevations into which they are little hardened, or more lenticular at base and confluent in the papery border (Acklin Island, *Brace*). Natural size.



1. AGAVE CACOEZELA.



2. AGAVE ACKLINICOLA.

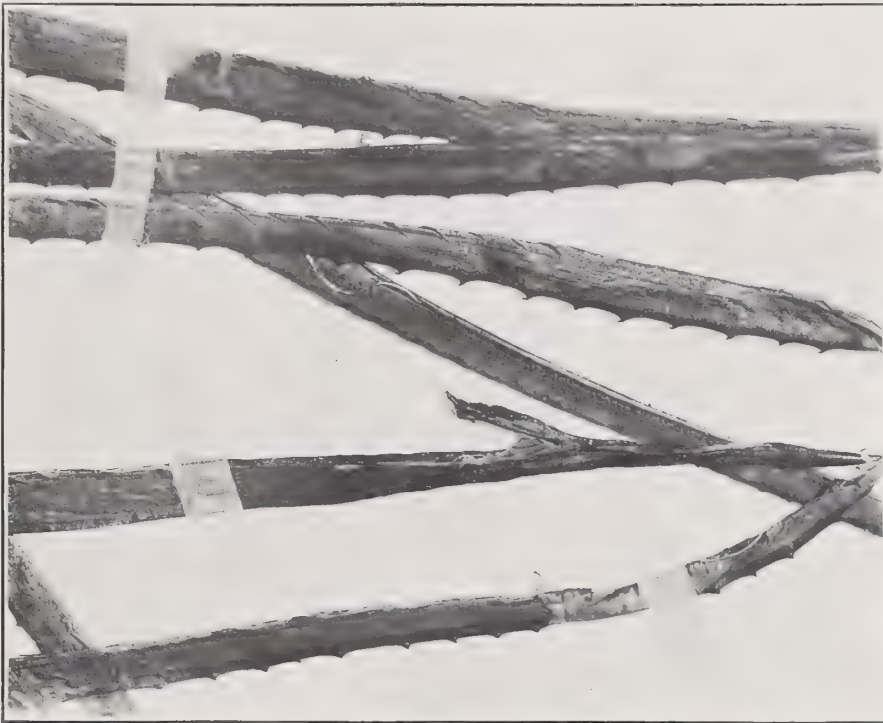
PLATE 92.

AGAVE INDAGATORUM (p. 42).

(The "Bamboo" of Watling Island.)

Figure 1. A leaf-tip and margin showing the conical narrowly grooved spine and the small curved prickles from very low prominences of the margin into which they are not lenticularly hardened. From herbarium material (*Britton and Millspaugh, 6155*). Natural size.

Figure 2. A cluster of capsules showing their elongated form, constricted stipe, and apical narrowing. From herbarium material (*Britton and Millspaugh, 6155*). Natural size.



1.



2.

AGAVE INDAGATORUM.

PLATE 93.

AGAVE WILLDINGII (p. 42).

[Plate 94 also.]

A photographic copy of Todaro's illustration (Hort. Bot. Panorm, vol. 2, pl. 32, 1891).
Reduced.

The congestion of the flowers at the ends of the panicle branches is especially noteworthy.



AGAVE WILLDINGII Tod.

AGAVE WILLDINGII.

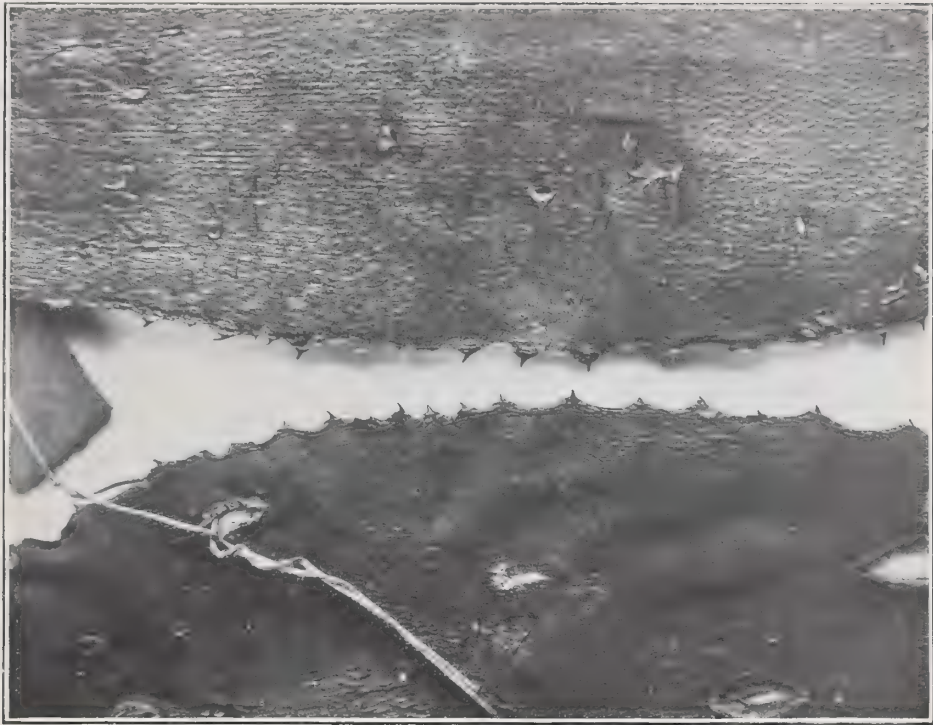
PLATE 94.

AGAVE WILLDINGII (p. 42).

[Plate 93 also.]

Figure 1. Two leaf-margins (the upper from Palermo under the erroneous name *A. Kewensis*, the lower from a plant grown at La Mortola, from Palermo) showing the slender curved prickles from low marginal elevations the tops of which are hardened. From herbarium material (cultivated at La Mortola, *Berger*). Natural size.

Figure 2. Two clusters of flowers. From herbarium material (cultivated at La Mortola, *Berger*). Natural size.



1



2

AGAVE WILLDINGII.

PLATE 95.

AGAVE PAPHYROCARPA (p. 44).

[Plates 96 and 97 also.]

A cluster of plants, one in fruit, on a hillside near Nueva Gerona, Isola de Pinos, Cuba, showing the characteristic form and spreading of the leaves and the small inflorescence with capsules rather densely clustered at the ends of its slender somewhat recurved branches. Photographed by the author. About one-fiftieth natural size.



AGAVE PAPYROCARPA.

PLATE 96.

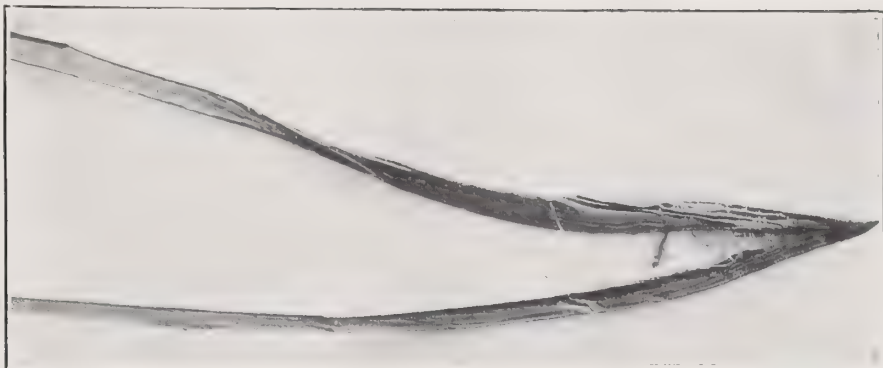
AGAVE PAPIROCARPA (p. 44).

[Plates 95 and 97 also.]

Figure 1. Leaf tip showing the gently curved spine narrowly grooved at the base; it is abnormally short and thick. From herbarium material (*Curtiss, 335*). Natural size.

Figure 2. Two margins showing the straight triangular prickles very slightly widened into the margin. From herbarium material (*Curtiss, 335*). Natural size.

Figure 3. Leaf tip and margin showing curved prickles. The spine should be compared with the one in figure 1, which is abnormally short and thick. From herbarium material (*Trelease, 20*). Natural size.



1



2.



3.

AGAVE PAPYROCARPA.

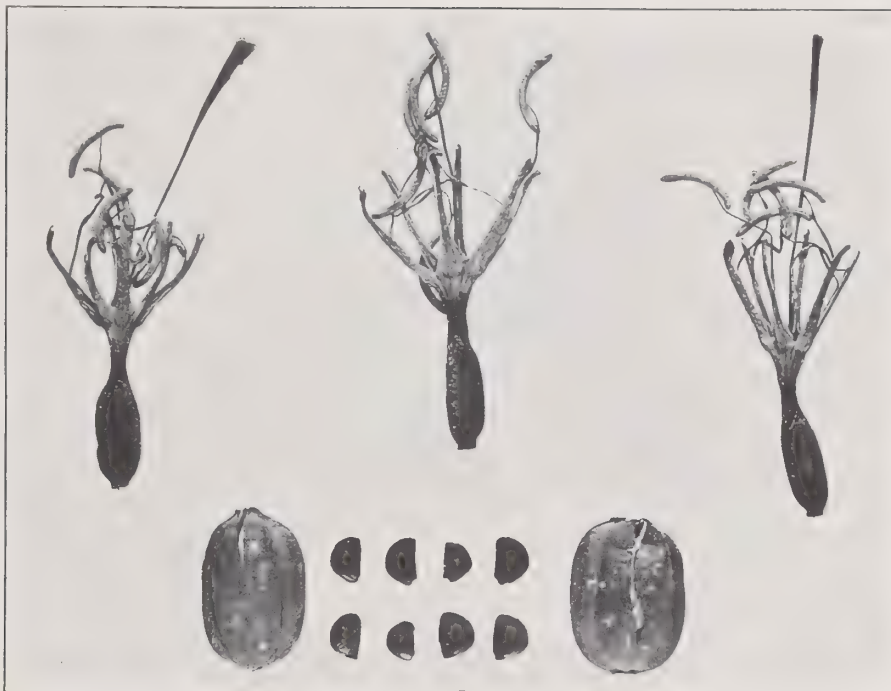
PLATE 97.

AGAVE PAPHYOCARPA (p. 44).

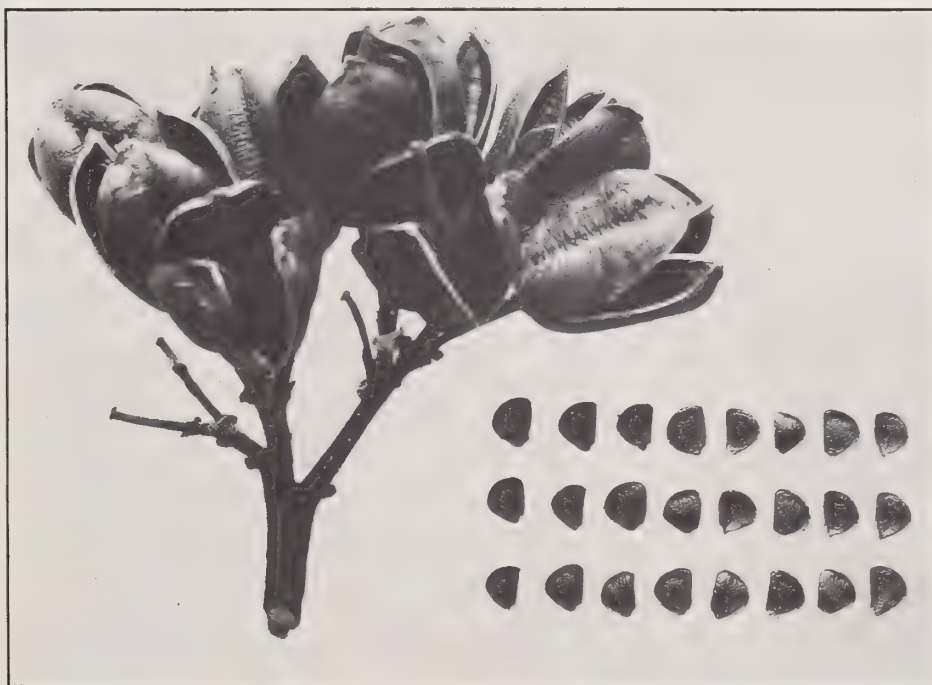
[Plates 95 and 96 also.]

Figure 1. Three flowers, two capsules, and eight seeds, showing the rather bottle-shaped ovaries of the small flowers. From herbarium material (*Curtiss, 335*). Natural size.

Figure 2. A panicle fragment showing the slender pedicels and closely-clustered, thin walled, round capsules not narrowed into a basal stipe; and twenty-four seeds. From herbarium material (*Trelease*). Natural size.



1.



2.

AGAVE PAPHYCARPA.

PLATE 98.

AGAVE BRITTONIANA (p. 44).

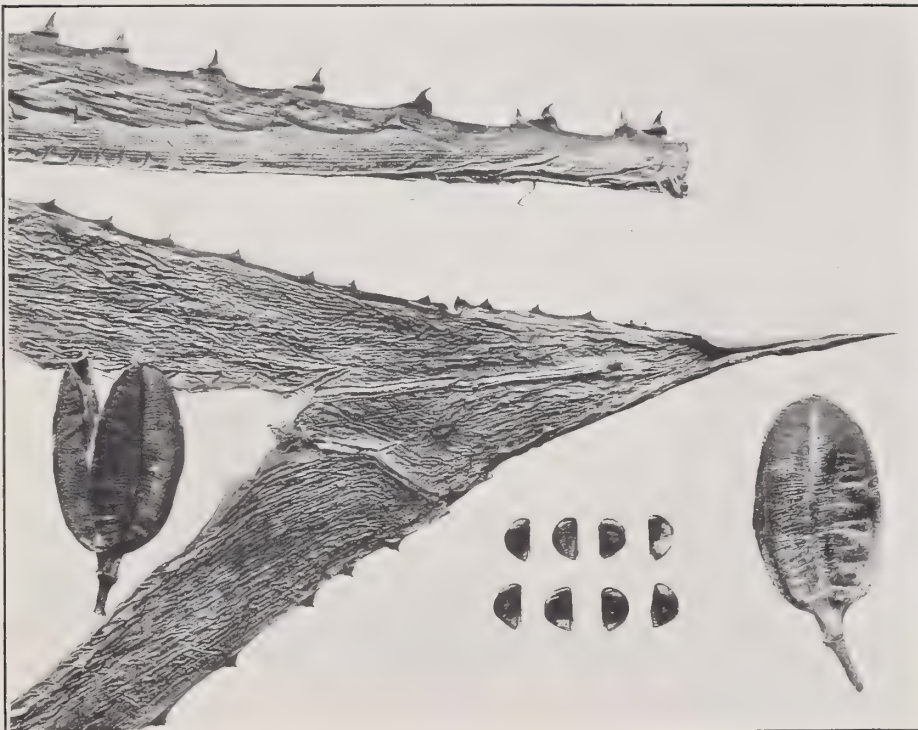
[Plate B also.]

Figure 1. A panicle fragment with an isolated and opened flower. From herbarium material (Cuba, *Britton, Earle, and Wilson*, 4776). Natural size.

Figure 2. Part of a leaf-tip and margin, two capsules, and eight seeds, showing the crowded slender pedicels, narrowly fusiform ovary, shallow tube with the long filaments inserted nearly in its throat, broadly oblong conspicuously stipitate capsules, slender round-grooved spine, and rather large curved prickles on marginal prominences the tops of which are hardened. From herbarium material (Cuba, *Britton, Earle, and Wilson*, 4776). Natural size.



1.



2.

AGAVE BRITTONIANA.

PLATE 99.

AGAVE BRITTONIANA BRACHYPUS (p. 45).

[Plate B also.]

Figure 1. Two leaf-tips, the end of a panicle-branch, two isolated capsules, one with the nearer half removed, a section of a capsule, and eight representative seeds; showing the slender round-grooved spine with the margins prickly and involute below, as in *A. vivipara*, heavy-based triangular prickles, crowded short pedicels, and oblong-pyriform capsules strongly stipitate at base and bearing at top remnants of the short-tubed flowers. From herbarium material (Cuba, Britton, Earle, and Wilson, 6183). Natural size.

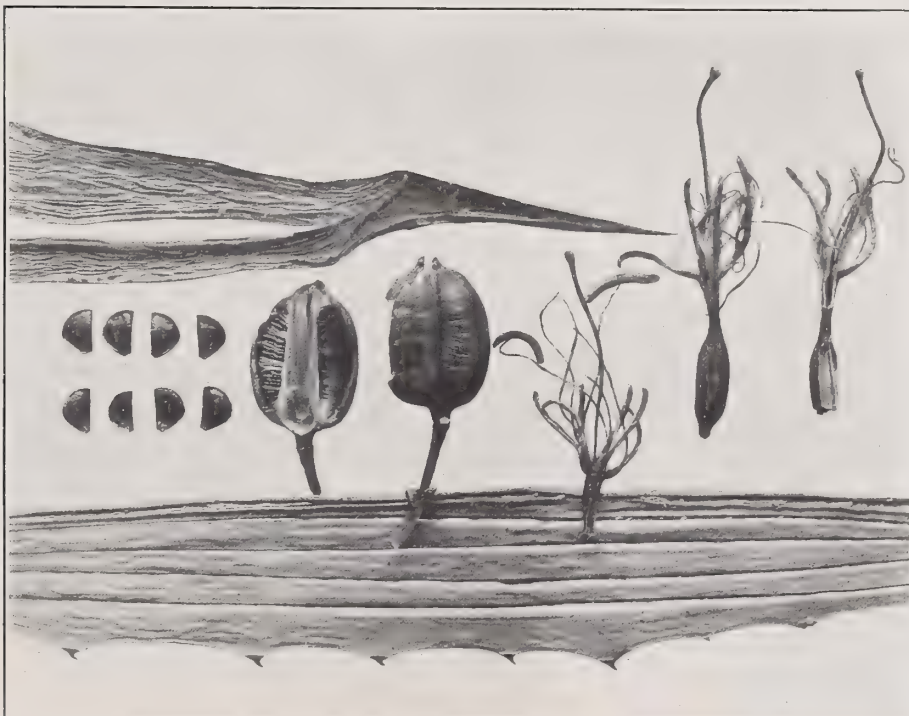
AGAVE TUBULATA (p. 45).

[Plate 100 also.]

Figure 2. A leaf-tip and margin; three flowers, one with the tube opened and another with the ovary removed at the bottom of the tube; two capsules, one in section; and eight seeds; showing the slender round-grooved spine, small curved prickles from low marginal elevations, the tops of which are a little hardened, small flowers with bottle-shaped ovaries and very narrowly funnel-shaped tube, and nearly round very shortly stipitate capsules. From herbarium material (Cuba, Britton, Britton, and Cowell, 9746). Natural size.



1. AGAVE BRITTONIANA BRACHYPUS.



2. AGAVE TUBULATA.

PLATE 100.

AGAVE TUBULATA (p. 45).

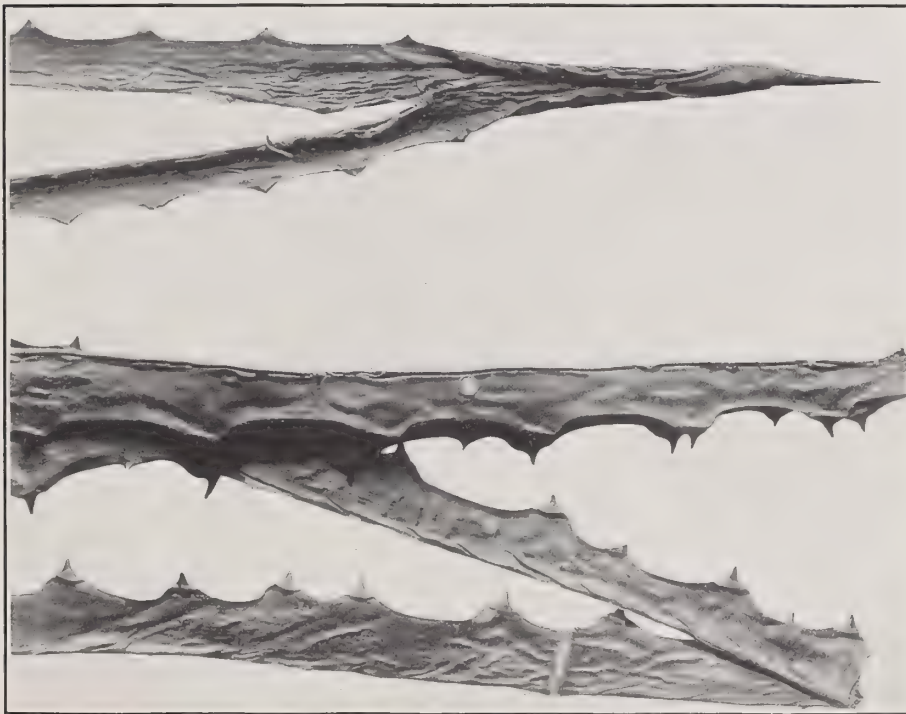
[Plate 99 also.]

Figure 1. End of a panicle branch and two detached capsules. From herbarium material (Cuba, *Britton, Britton, and Gager, 7388*). Natural size.

Figure 2. Leaf-tip and margin showing the slender spine (here abnormally undulate), prickles hardened onto the tops of marginal prominences, slender pedicels, and densely crowded thin-walled short capsules. From herbarium material (Cuba, *Britton, Britton, and Gager, 7388*). Natural size.



1.



2.

AGAVE TUBULATA.

PLATE 101.

AGAVE NASHII (p. 45).

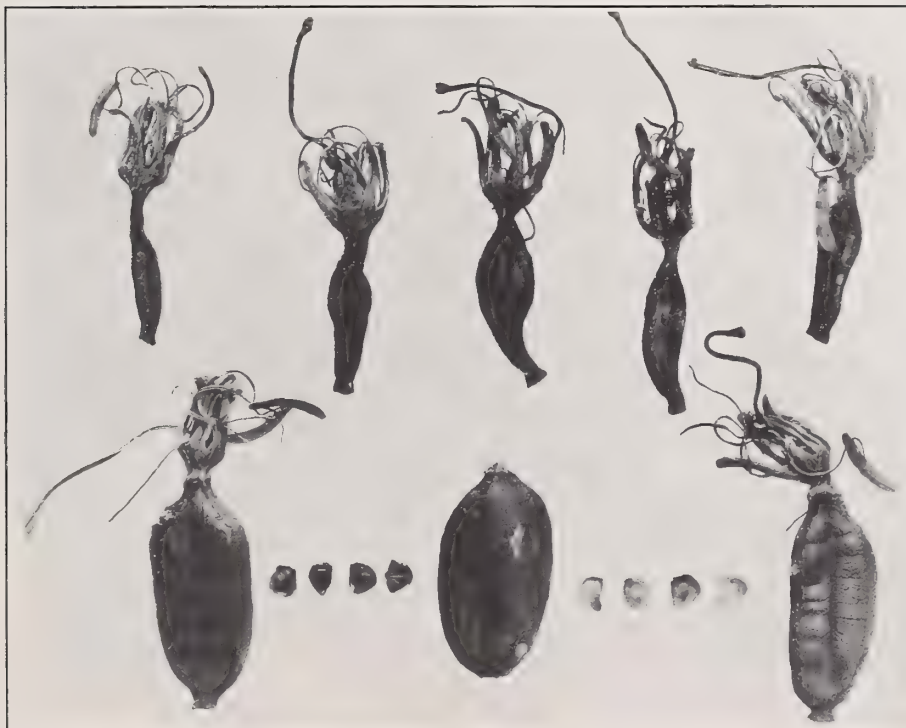
[Plates B, 102, and 103 also.]

Figure 1. A representative group of plants, two with inflorescence, showing the cespitose suckering, erect leaves, slender scapes and small panicles with the flowers and capsules clustered at the ends of their slender recurved-ascending branches. Photographed on Great Inagua by Mr. G. V. Nash; the source of Journ. New York Bot. Gard., vol. 6, p. 12, fig. 4. About one-fiftieth natural size.

Figure 2. Flowers, capsules, and immature seeds. From herbarium material (Great Inagua, *Nash and Taylor, 1389*). Natural size.



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2.

AGAVE NASHII.

PLATE 102.

AGAVE NASHII (p. 45).

[Plates B, 101, and 103 also.]

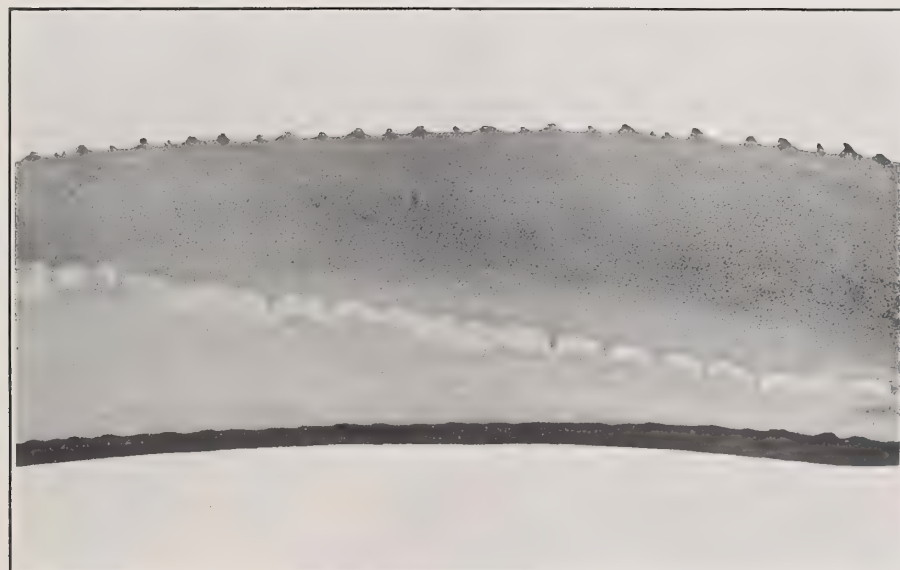
Figures 1, 2, and 3. Two leaf-tips and the middle of a leaf showing the large recurved narrowly grooved spine and the close-set unequal prickles slightly elevated by marginal prominences and so brittle that most of them have been broken. From herbarium material derived from a plant collected on Great Inagua (*Nash and Taylor, 517*). Natural size.



1.



2.



3.

AGAVE NASHII.

PLATE 103.

AGAVE NASHII (p. 45).

[Plates B, 101, and 102 also.]

Figure 1. A cluster of flowers, some of them well advanced as indicated by the protruded style. From herbarium material (Great Inagua, *Nash and Taylor, 1389*). Natural size.

AGAVE INAGUENSIS (p. 47).

[Plates 104 and 105 also.]

Figure 2. A cluster of pedicels and four flowers, showing the rather short pedicels and relatively large flowers with elongated filaments. From herbarium material (South Caicos, *Wilson, 7684*). Natural size.



1. AGAVE NASHII.



2. AGAVE INAGUENSIS.

PLATE 104.

AGAVE INAGUENSIS (p. 47).

[Plates 103 and 105 also.]

A plant cultivated at the Missouri Botanical Garden collected on Little Inagua (*Nash and Taylor, 21832*), showing the stiffly erect glaucous quickly acute leaves. About one-fifth natural size.



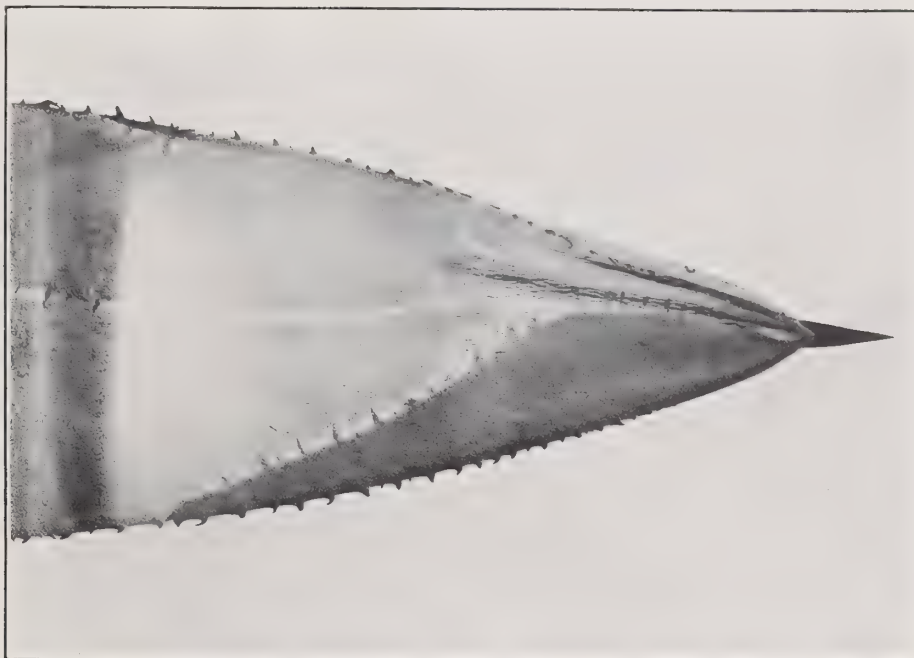
AGAVE INAGUENSIS.

PLATE 105.

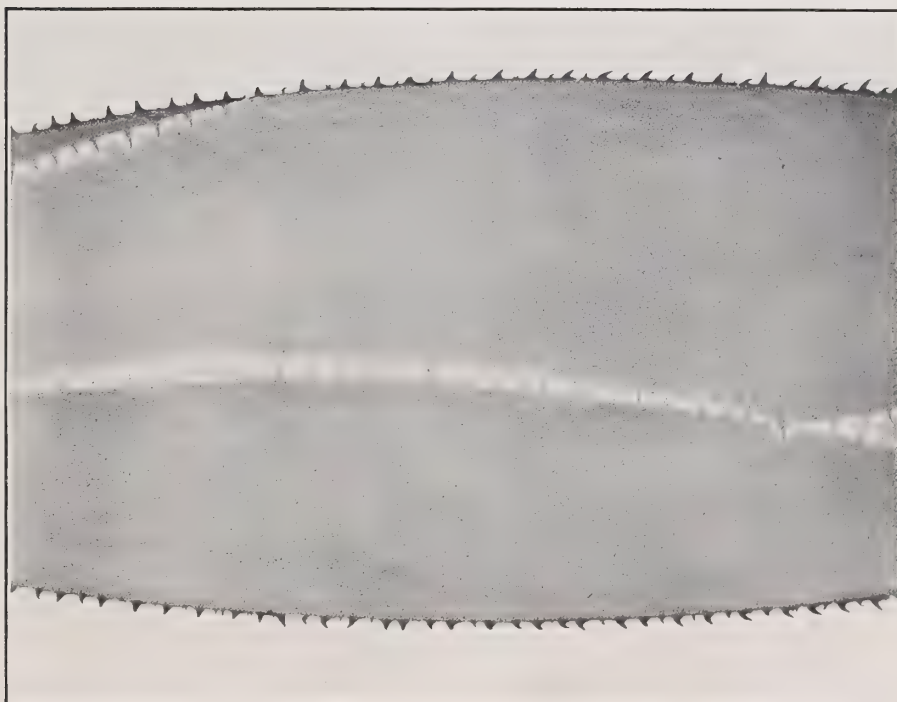
AGAVE INAGUENSIS (p. 47).

[Plates 103 and 104 also.]

Figures 1 and 2. Tip and middle portion of a fresh leaf from the plant figured on plate 104, showing the slender unequal prickles not hardened into the margin and the short narrowly-grooved spine. Natural size.



1.



2.

AGAVE INAGUENSIS.

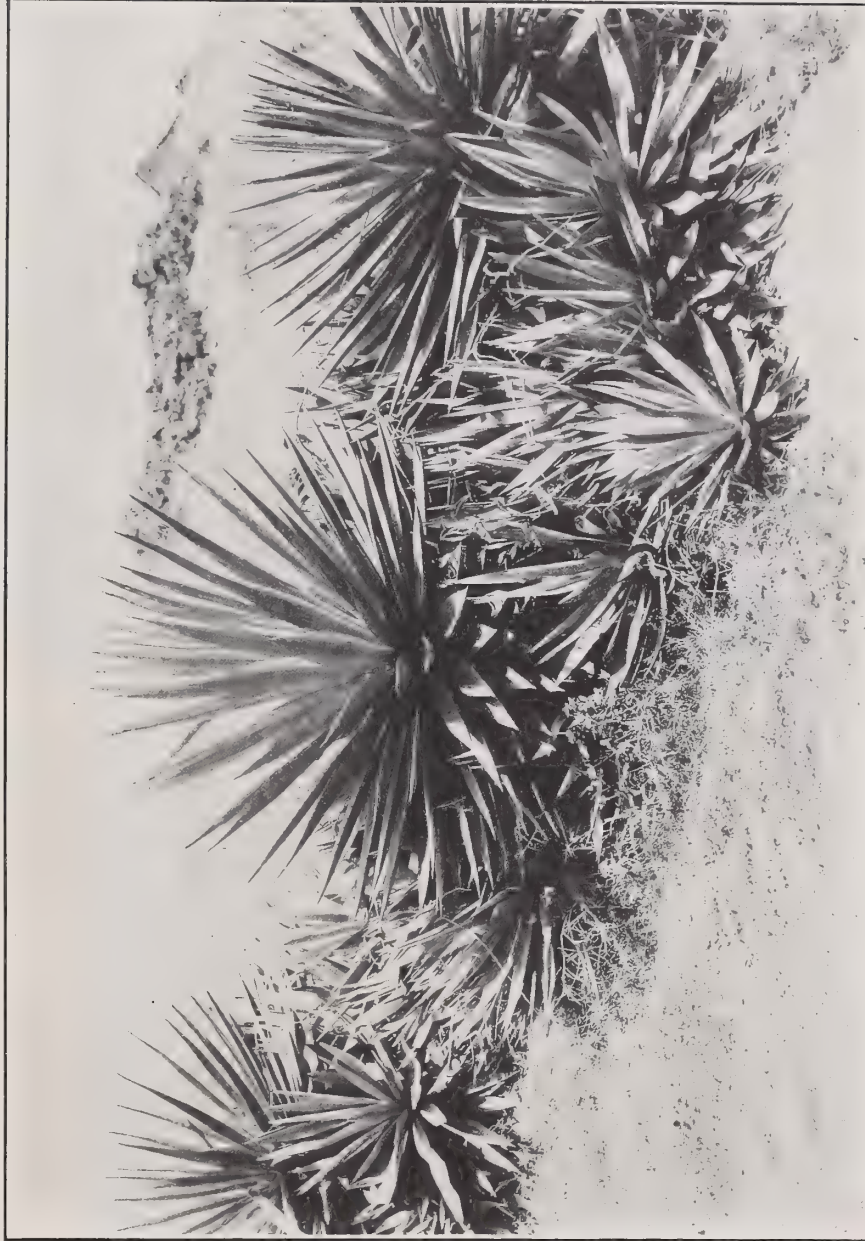
PLATE 106.

AGAVE ANGUSTIFOLIA (47).

(The "Spanish needle" of Barbados.)

[Plates 107-109 also.]

A characteristic cluster of plants showing their cespitose suckering and straight spreading dagger-like leaves. Photographed on Barbados by the author. About one-fifteenth natural size.



AGAVE ANGUSTIFOLIA.

PLATE 107.

AGAVE ANGUSTIFOLIA (47).

[Plates 106, 108, and 109 also.]

An old fruiting plant (in a hedgerow of *Agave barbadensis*) showing the slender elongated scape and small panicle with ascending branches. Photographed on Barbados by the author. About one-fiftieth natural size.



AGAVE ANGUSTIFOLIA AND A. BARBADENSIS.

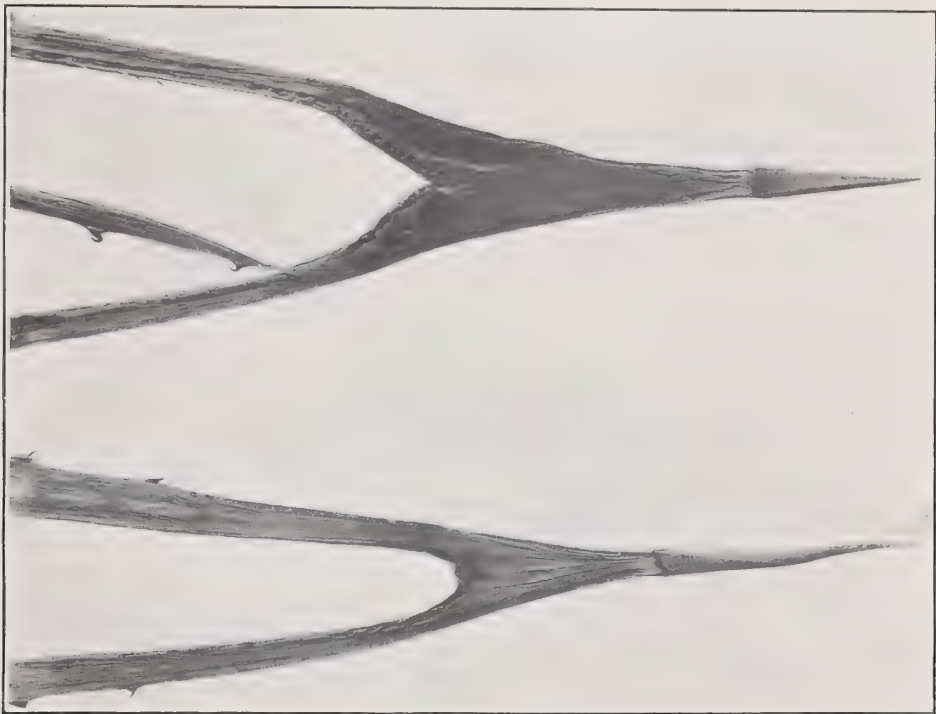
PLATE 108.

AGAVE ANGUSTIFOLIA (p. 47.)

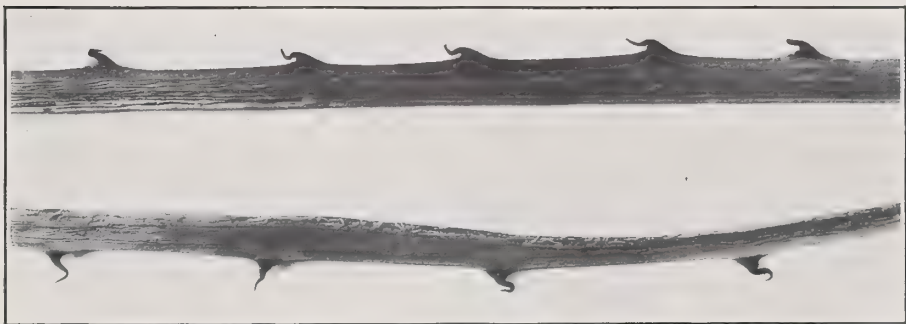
[Plates 106, 107, and 109 also.]

Figure 1. Leaf-tips showing the needle-like sometimes flexuous spine flattened on the upper face. From herbarium material (Barbados, *Trelease*). Natural size.

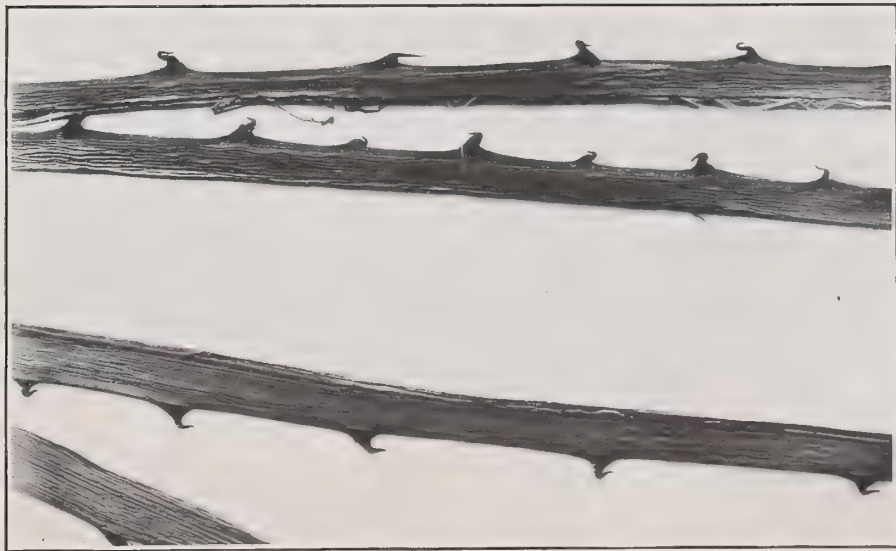
Figures 2 and 3. Margins showing the very slender hooked or doubly curved prickles often from heavy triangular bases which do not harden into the margin. From herbarium material (Barbados, *Trelease*). Natural size.



1.



2.



3.

AGAVE ANGUSTIFOLIA.

PLATE 109.

AGAVE ANGUSTIFOLIA (p. 47.)

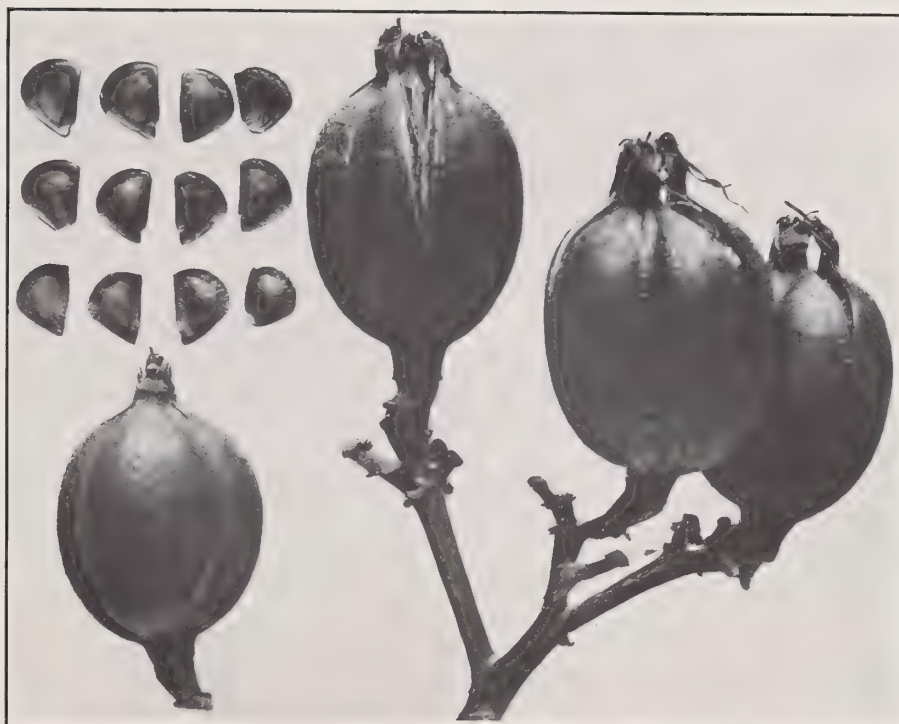
[Plates 106-108 also.]

Figure 1. Three flowers showing the short ovary, rather deep tube, and moderately long filaments. From herbarium material (Barbados, *Waby, 107*). Photographed in the United States National Herbarium, by permission. Natural size.

Figure 2. Part of a panicle branch with three capsules, a detached capsule, and twelve seeds, showing the short pedicels, nearly globose strongly stipitate and beaked capsules, and large seeds. From herbarium material taken from the plant pictured on plate 107 (Barbados, *Trelease*). Natural size.



1.



2.

AGAVE ANGUSTIFOLIA.

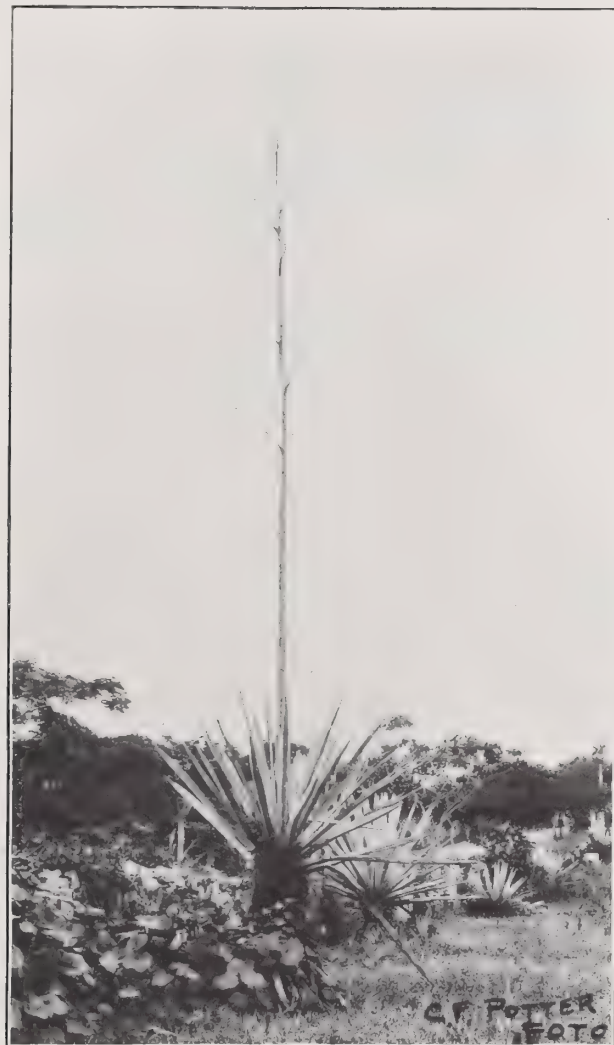
PLATE 110.

AGAVE FOURCROYDES (p. 48).

(The "Henequen" of Yucatan.)

[Plates 111 and 112 also.]

A roadside plantation, the nearest plant with an old panicle, showing the elongated trunk from the lower part of which the leaves have been cut, the long straight sword-shaped leaves, and the slender scape with rather short spreading panicle branches above. Photographed in Cuba by Mr. C. F. Potter. About one one-hundredth natural size.



AGAVE FORUCROYDES.

PLATE 111.

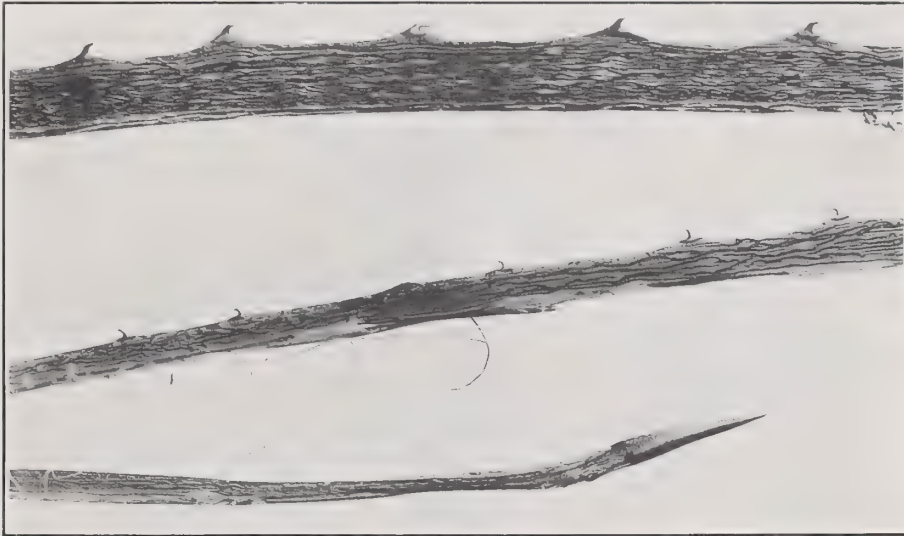
AGAVE SISALANA ARMATA (p. 49).

Figure 1. A partial leaf-margin showing the slender spine openly grooved at the very base, and well-developed triangular curved prickles somewhat lenticularly widened into the tops of low marginal prominences. From herbarium material (Hope Gardens, Jamaica, *Harris*). Natural size.

AGAVE FOURCROYDES (p. 48).

[Plates 110 and 112 also.]

Figure 2. A leaf-tip and margins and a flower, showing the stout curved spine openly grooved below the middle, strong though small hooked prickles lenticularly widened onto the margin, and rather large flower. From herbarium material (Cuba, *Britton, Cowell, and Leon, 9580*). Natural size.



1. AGAVE SISALANA ARMATA.



2. AGAVE FORUCROYDES.

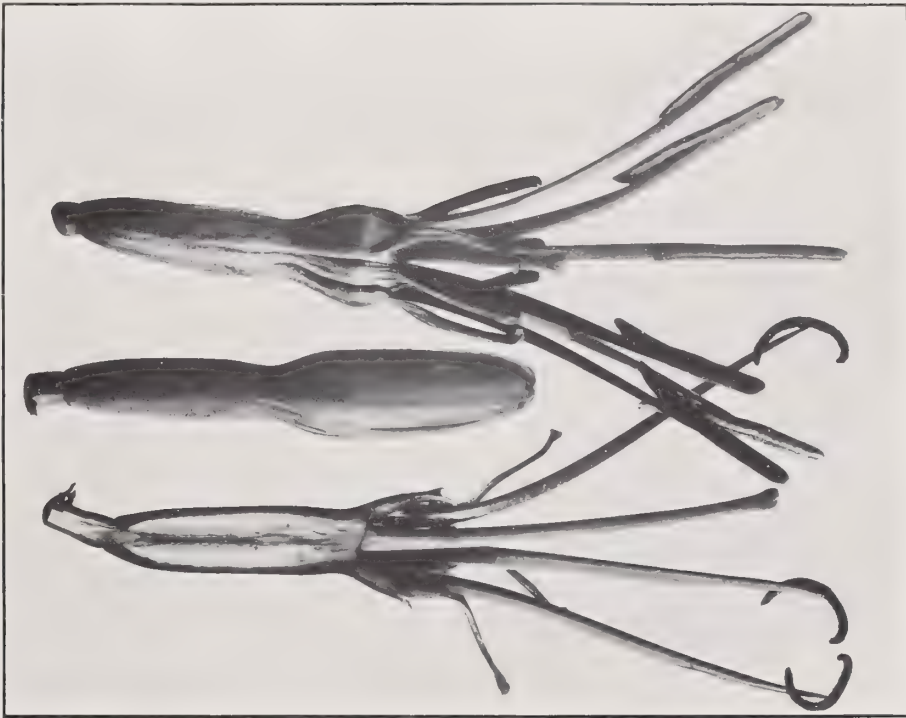
PLATE 112.

AGAVE FOURCROYDES (p. 48).

[Plates 110 and 111 also.]

Figure 1. Fresh flowers showing the relatively long ovary and the characteristic urceolate contraction of the throat of the tube. From material cultivated in the Missouri Botanical Garden. Natural size.

Figure 2. Capsules showing their usual pear-shape, very short basal contraction, and apical beak, and large seeds. From material cultivated in the Missouri Botanical Garden. Natural size.



1.



2.

AGAVE FORUCROYDES.

PLATE 113.

AGAVE SISALANA (p. 49).

(The "Sisal hemp" of Yucatan.)

[Plates B, 114, and 115 also.]

Two plants with inflorescence showing the rather ample panicles with slender spreading branches. Photographed on St. Croix by the author. About one-fortieth natural size.



AGAVE SISALANA.

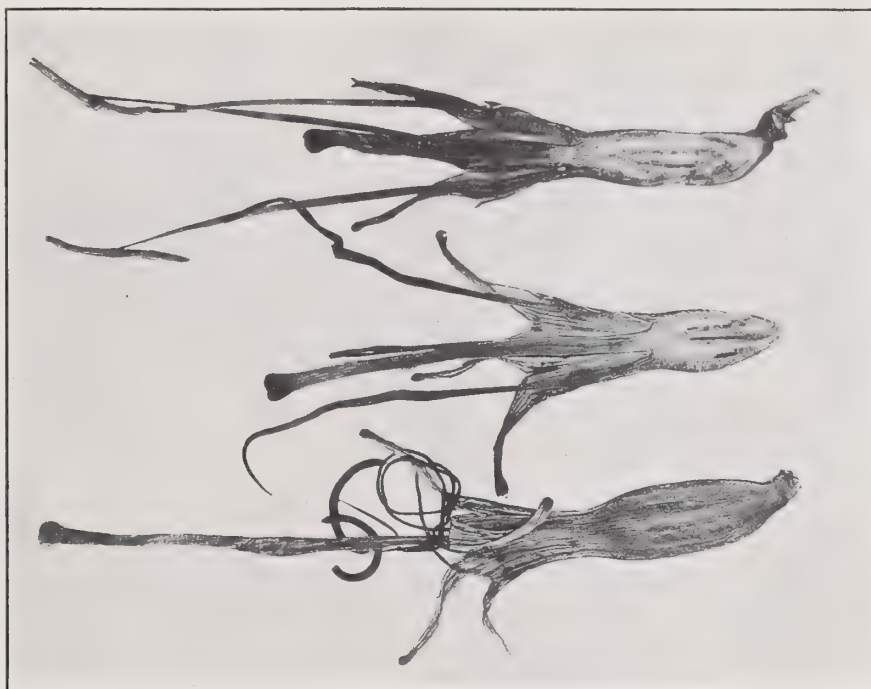
PLATE 114.

AGAVE SISALANA (p. 49).

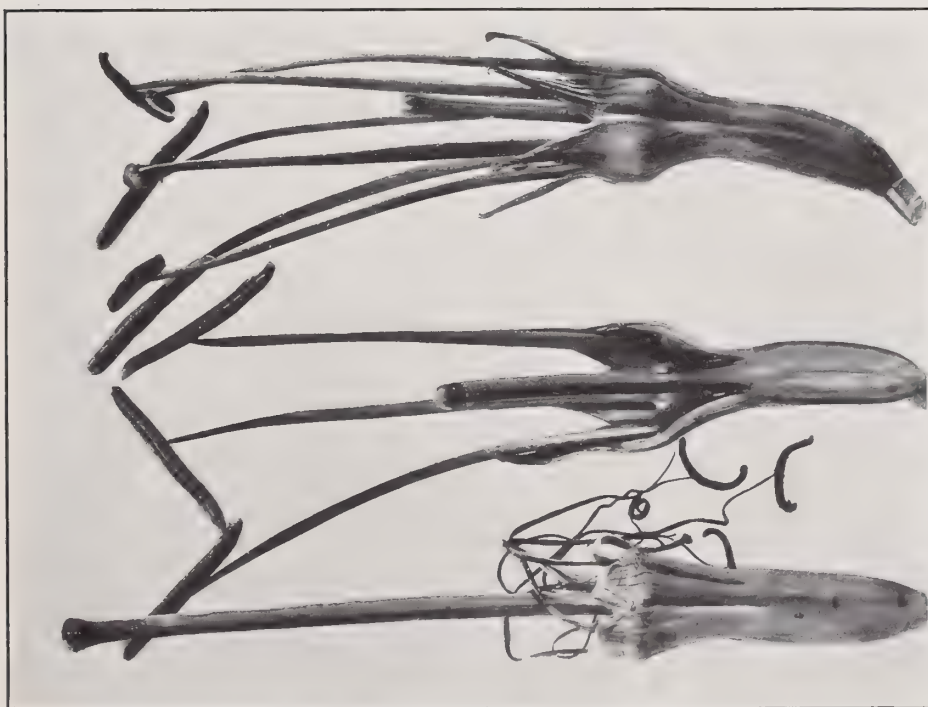
[Plates B, 113, and 115 also.]

Figure 1. Three flowers from herbarium material (St. Croix, *Trelease*). Natural size.

Figure 2. Three fresh flowers, one with the nearer half removed, from a plant cultivated at the Missouri Botanical Garden. The short ovary and greatly elongated filaments inserted rather above the middle of the (when fresh) urceolately contracted deep tube are shown. Natural size.



1.



2.

AGAVE SISALANA.

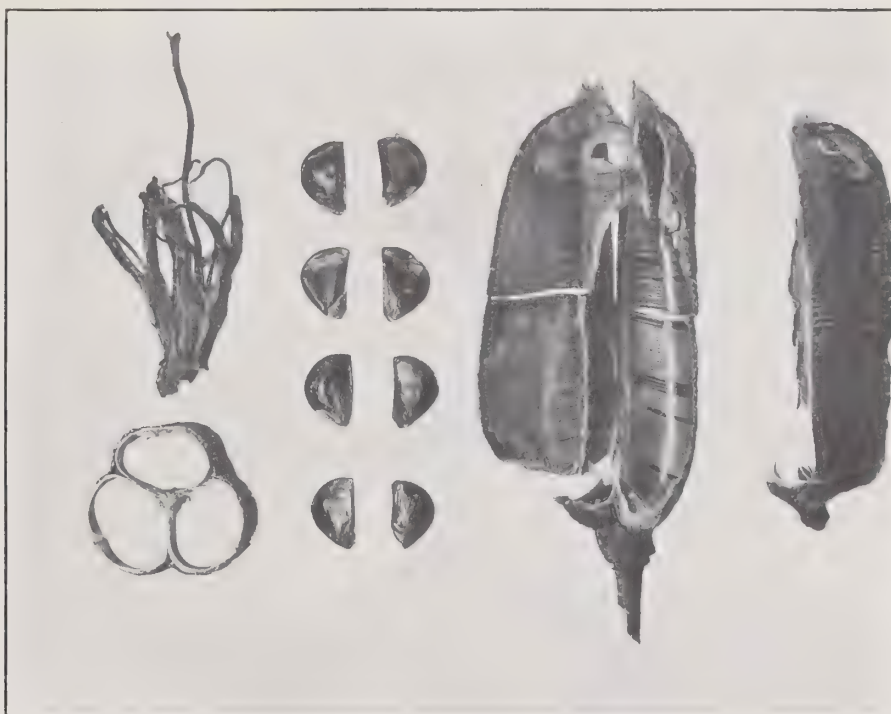
PLATE 115.

AGAVE SISALANA (p. 49).

[Plates B, 113, and 114 also.]

Figure 1. A withered perianth, section and fragments of capsules, and large seeds, showing the oblong form of the fruit, which is very rarely produced, and its short stout stipe and beak. From herbarium material (New Providence, *Mrs. Britton*, 3415). Natural size.

Figure 2. The base of a flowering plant, with other panicles in the background, showing the elongated straight sword-like leaves and the narrowly triangular bracts. Photographed on St. Croix by the author. About one-twentieth natural size.



1.



2.

AGAVE SISALANA.

PLATE 116.

AGAVE EVADENS (p. 20).

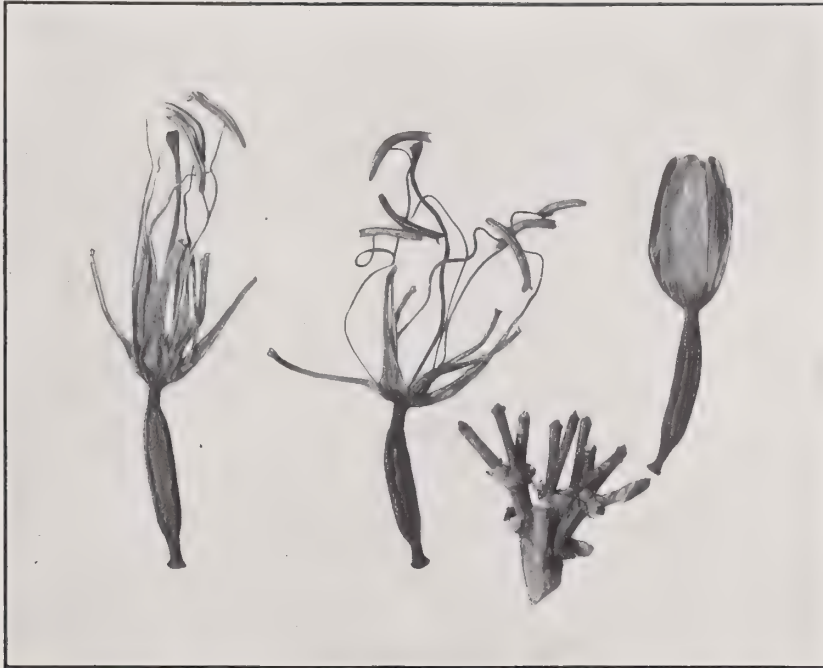
[Plates 9 and 10 also.]

Figure 1. Pedicels, flower bud, and two opened flowers. From herbarium material (Trinidad, *Crueger, 1333*), photographed in the Krug and Urban herbarium by permission of Professor Urban. Natural size.

AGAVE ALBESCENS (p. 44).

[Plate 53 also.]

Figure 2. Pedicels and flowers, one opened. From herbarium material (Guantanamo, *Eggers, 4563*), photographed in the Krug and Urban herbarium by permission of Professor Urban. Natural size.



1. AGAVE EVADENS.



2. AGAVE ALBESCENS.

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